日本古生物学會報告・紀事

Transactions and Proceedings of the Palaeontological Society of Japan

昭和 11 年　　第 4 號
1936　　No. 4

〔地質學雜誌　第 43 卷　第 514-516 號　抜刷〕
[Reprinted from Jour. Geol. Soc. Japan, Vol. 43, No. 514-516.]

日本古生物學會
Palaeontological Society of Japan

目 次 CONTENTS

報 告 Transactions

17. *Parastegodon* 屬に就いて

鹿間時夫

（昭和 11 年 2 月 29 日講演，4 月 29 日受理）

意　　義

Parastegodon 屬は 1924年，松本博士により，加賀國戸室山産の *Elephas aurorae* MATSUMOTO, 1918 を genotype とし，*Stegodon mindanensis* NAUMANN 及び *Elephas planifrons* FALC. & CAUTL. の一部を referred species として創設されたものである。[1] *aurorae* 象は提唱された當時 *Elephas* に入れられた程，分化の進んだ象で *Stegodon* 亞科の中進化の極點に位置するものである。[2] 然し，其の標本が單に右上顎第２大臼齒１個に過ぎず，genotype としては不完全な種であり，又 *Stegodon mindanensis* NAUMANN も臼齒の斷片的標本しか知られず，*Elephas planifrons* FALC. & CAUTL.（可成り變異に富む種で，臼齒の性狀は複雜である。）も，如何なる標本群を博士が採られたのか分明せず，顎骨其他の性質が充分判明せず，屬の定義が稍薄弱であつた。加ふるに *aurorae* 象は瓜哇の *Stegodon airawana* MARTIN に良く似て居て，DIETRICH, MAAREL 等[3]

1) MATSUMOTO, H., 1929. On *Parastegodon* MATSUMOTO and its Bearing on the Descent of Earlier Elephant. Sci. Rep. Tôhoku Imp. Univ., Sendai, Ser. 2 (Geol.), vol. XIII, no. 1, pp. 13-15.

2) MATSUMOTO, H., 1918. On a new Archetypal Fossil Elephant from Mt. Tomuro, Prov. Kaga. Ibid. vol. III, no. 2, pp. 51-56.

松本博士は廣義の象に入れられた。

3) DIETRICH, W. O., 1929. Discussion of Matsumoto's papers in Sci. Rep. Tôhoku Imp. Univ. Sendai, Japan, XIII. 1929. Neues Jahrb. f. Min, etc., Jhrg. 19, III, pp. 466-467.

は *aurorae* を *airawana* の1進化型に過ぎずとし，*Paras'egodon* 属も又從つて，*Stegodon* 属の synonym に過ぎぬと考へた。彼等にして見れば *Parastegodon* なる属は，*Stegodon* と *Archidiskodon* (*planifrons* を含む) に入る可き種を寄せ集めたに過ぎず，意味が無い如く思はれるらしい。一般に *Parastegodon* は以上の如き理由によつて，あまり採用されなかつた様である。[1] むしろ問題にされなかつた様である。之は後說の如く本属の分布が主として，日本と馬來群島であつて，歐米の學者にして標本に接する機尠く，馬來群島の標本を取扱へる和蘭の學者は一様に *Stegodon* と見做して居る現狀であるから議論の餘地がないのである。

然るに最近本邦より *aurorae* に類した象の標本が可成り多數發見されるに至つたので，*Parastegodon* 属の吟味を必要とするに至つた。之等標本と馬來群島の *Stegodon* の關係は可成り密接であり重要なものである。卽ち，Leiden 博物館其他歐洲に持行かれた馬來群島産の所謂 *Stegodon* 標本が，大英博物館の印度産 *Stegodon* 象の標本と極めて密接とすれば，當然本邦で使用される *Parastegodon* は，廢棄するより他ない譯である。

何人も首肯し得る事は，*Stegodon* の genotype たる *S. cliftii* (Falc. & Cautl.) と *aurorae* が一段と顯著な相違を有する事で，贅言を要しない。要は一方は所謂 *Stegodon* の中，最も原始的なものであり，他は最も進化したものだからである。そして兩者を系統的に辿つて行けば，連續してしまふ。*Parastegodon* 属を認めるも認めないも，此の連續性の信用如何である。吟味に當つて私が不安を感じたのは，兩属の間に，形質の質的相違なく，量的相違しか認められない事であつた。かゝる量的相違を属の分類要素にとるを好まぬ人から見れば，何も *Parastegodon* の如き，獨立させる必要がないのである。

元來，馬來群島の所謂 *Stegodon* (*airawana, trigonocephalus, mindanensis*) は *Stegodon* 亞科の中でも可成り分化した1群である。Dubois の如く，印度 Siwalik の *Stegodon* との相違を認めぬ人も居るが，Janensch 其他により可

1) Maarel, F. H., 1932. Contribution to the Knowledge of the Fossil Mammalian Fauna of Java. Wetens. Meded., no. 15, p. 162.

成り判つきりと區別された。OSBORN の如き，*Stegodon* と呼ぶも，Siwalik の *Stegodon* プロパーと別系統の如く考へて居た様である。然し，最も近似したものは，多くの著者が指適して居る如く，*insignis* と *ganesa* である。松本博士の *Parastegodon* 屬の定義「古型の象にて頬齒は subhypsodont にて稜式低く，稜は側面より觀て狹く，其の基部は多少尨大するも互に接せず，磨滅せられたる稜は長楕圓形乃至半楕圓形を呈し，Loxodont sinus を缺く。中央溝は現れ屢々良く發達す。谷は狹く，側面觀にて銳し。齒根は多き傾向あり。」は，之を，馬來群島產所謂 *Stegodon* に適用して矛盾しない。松本博士は *Parastegodon* に *mindanensis* のみを採られ他の 2 種は *Stegodon* 屬に入れられたが，此の區分は明瞭でない様に思ふ。むしろ DIETRICH 等に從ひ，他の 2 種をも含ませ，馬來群島產所謂 *Stegodon* の上揭 3 種を *Parastegodon* に入れんとするのが私の考である。卽ち和蘭の學者の稱する *Stegodon* を *Parastegodon* とするものである。

Parastegodon は次の 7 種を含む。[1)]

1. *P. aurorae* (MATSUMOTO)
2. *P. mindanensis* (NAUMANN) MATSUMOTO
3. *P. trigonocephalus* (MARTIN) SHIKAMA comb. nov.
4. *P. airawana* (MARTIN) SHIKAMA comb. nov.
5. *P. akasl iensis* TAKAI
6. *P. infrequens* SHIKAMA
7. *P. kwantoensis* TOKUNAGA

---

1) 他に最近德永博士所報の *Parastegodon sugiyamai* TOKUNAGA, 1935. がある。
氏によると，*airawana* に酷似し，稜の琺瑯褶襞の狀態により區別されると。琺瑯褶襞 enamel plication は可成りデリケートな性質を有し，種的區別に用ひ得る程固定した形質を具備するとは考へられない。直接標本を觀ない限り，詳細な性質は判明しない程である。*sugiyamai* については殘念乍ら考察より除外する。
又，爪哇には *Stegodon trigonocephalus praecursor* KOENIGSWALD, 1933. がある。*S. t. trigonocephalus* より原始的な一亞種とされて居る。

特　　徴

本屬は *Stegodontinae* Osborn と *Mammontinae* Osborn の中間的性質を具備し，*Stegodon* と *Archidiskodon*, *Parelephas* 等と密接な關係にある。松本博士の揭げられた屬定義以外更に，*Stegodon* と區別する爲次の性質を揭げる。

a. 頰齒は第2大臼齒で稜數9以上，第3大臼齒で稜數13以上，時に15に達する。*Stegodon* では第2大臼齒稜數の極値平均8，第3大臼齒の稜數は13以下である。(例外は除く)。100 粍中の稜數（稜頻度）は3.5以上，時に6に達する。*S. cliftii* は平均3，*S. insignis* も3，*S. orientalis* は3.5，*S. sinensis* も3.5，*Archidiskodon planifrons* は4.5であるから，稜頻度は *planifrons* に匹敵し，*cliftii* の約2倍に達する事がある。*S. orientalis shodoensis* Matsumoto, 1924[1]（歐文發表なく圖示されて居ない）のみは稜頻度4～4.5で，*Stegodon* 斷末期のものであるとの事であるが，區別出來難い。眞に本種に入るべきものなれば蓋し例外である。

之等の性質は要するに稜銳く谷の狹い型を表現して居るに過ぎない。

b. 稜には時に，特別の場合，*Archidiskodon* 程著しくないが，前後兩方向へのかすかな膨脹 mesial expansion を示す事あり[2]。

c. 稜壁，琺瑯質は內外2層に分れ，厚さは其々同樣か，又は內層の方が厚い。*Stegodon* では一般に外層が著しく厚い。琺瑯壁が表面滑かなのは元來粗鬆な外層表面が磨滅せられて，外層の內部又は，內層が露出して居るのである。

d. 象牙質は相當量で未だ磨滅せられない稜を被ふ。

其他注意すべき性質は，特に第2大臼齒，第3大臼齒の後方の稜が上面より見て，波狀に，又はS字形に，又はZ形に屈曲する事である。之は稜の過剩發育による一種の病的現象と思はれ，catagenensis を以て說明し度い。蓋し，第3大臼齒稜數13～15にて，細長く小形の低い頰齒は，*Stegodon* 系統の後裔として

(1) 松本彥七郎：日本產ステゴドンの種類．地質學雜誌 31卷 373-4 號。

(2) Shikama, T., 1936. On *Parastegodon infrequens* sp. nov. from the Akasi District. 上梓中

は異常なものであるから，かゝる病的現象の生じたものであろう。*S. orientalis* や *S. sinensis* の如き稜の眞直なのが特徴な程である。(Owen による。)

Parastegodon 中，頭骨の性質判明せるものは，*airawana*, *trigonocephalus* 及び *akashiensis* の 3 種である。*airawana-trigonocephalus* は特に鼻孔窩の形狀，前頭骨の形狀其他より *S. ganesa* に類する。*akashiensis* は同樣の形狀，*S. insignis* 又は *A. planifrons* に類する。(1) 馬來群馬の *Parastegodon* と日本の *Parastegodon* は齒で類似しても，頭骨に於いて異ると思はれる。日本の *Parastegodon* が *Archidiskodon* と關係ある事，*P. infrequens* 及び *P. kwantoensis* に於いて認められる事である。但し問題は *S. orientalis* で，之と *S. insignis* が同種か否かの問題は議論の種となつたが，未だ *orientalis* の頭骨の完全な復舊も行はれて居ず，比較する事すら出來難いが，想像するに *akashiensis* 等と近いものかも知れない。*insignis*, *orientalis*, *ganesa*, *airawana*, *akashiensis* 等頬齒は互に密接な關係があるが，頭骨等考慮に入れると *Parastegodon* には *airawana* 等馬來群島系統と，*akashiensis-aurorae* の系統に別れ，更に *infrequens-kwantoensis* の別系統が存する樣に思ふ。

分　　類

I. 稜の中央膨脹 mesial expansion なし。

I a. 稜頻度，上顎第 2 大臼齒にて 100 粍中 5 乃至 6.

I a′. 上顎第 2 大臼齒の稜數 10，象牙質著しからず，齒冠基底線は著しく凸形……*P. aurorae*

I a″. 上顎第 2 大臼齒の稜數 9，象牙質著し，齒冠基底線は緩やかである……*P. akashiensis*

I b. 稜頻度上顎第 2 大臼齒にて 100 粍中 5 以下。

I b′. 上顎第 2 大臼齒の稜數 9 乃至 10，稜は屋根形にて，強き稜楷 Stufenbildungen あり……*P. trigonocephalus*

(1) Shikama, T., 1936. Note on *Parastegodon akashiensis* Takai from the Akasi District. Proc. Imp. Acad. Tôkyô, vol. XII, no. 1, pp. 22-24.

Ⅰb″. 上顎第 2 大臼齒の稜數 9 乃至 10, 稜は煉瓦形にて, 强き中央溝 longitudinal cleft あり ……*P. mindanensis*

Ⅰb‴. 上顎第 2 大臼齒の稜數 9, 煉瓦形 ……*P. airawana*

Ⅱ. 稜の中央膨脹かすかに存す。

Ⅱa. 下顎第 2 大臼齒にて稜頻度 100 粍中 5 乃至 6, 稜は平行 ……*P. kwantoensis*

Ⅱb. 下顎第 2 大臼齒にて稜頻度 100 粍中 4 乃至 4.5, 稜は平行ならず側面に開く ……*P. infrequens*

系統的位置, 分布

Parastegodon の系統的位置は甚だ興味がある。松本博士は之を *Stegodon* と對した廣義の象に入れられ, 恐らく *bombifrons* と思はれる *Stegodon* より, Upper Pontian に派生したものであらうとされ, 印度——日本が分布中心地であり, *Archidiskodon* とは無關係であるが, *Parelephas* の祖型であらうとされて居る。所で此の最後の考は最近の層位的材料と矛盾する。*Parastegodon* は洪積世まで殘存して居るし, そんなに古型のものと考へられない。*Archidiskodon* や *Parelephas* との親疎は兎や角議論出來ないが, 兎に角, *Mammontinae* Osborn, 1925 と關係ある事は確である。松本博士の象も恐らく此の *Mammontinae* に入れんとされるのであらう。*Mammontinae* に入れるか *Stegodontinae* に入れるかは之又議論出來難い。兩亞科の中間的性質を持つて居る樣である。私はむしろ *Archidiskodon* と關係があつた樣に考へ度い。

Archidiskodon (*proplanifrons*, *subplanifrons* 等) はアフリカに於いて發生し, 上部鮮新世の南部, 西部, 東部亞細亞の隆起に伴ひ, 歐洲から馬來群島, 支那までに亘る大移動を開始した可成り汎世界的な象である。當時移動の徑路に當つて居たと思はれる東南部亞細亞, 現在の馬來群島, 南支那海, 東支那海等の低濕な地方に於いて *Stegodon* のプロパーな系統と交涉したであらう。日本に *Parelephas protomammonteus* の現れた時代に相當する。卽ち上部鮮新世に於いて *Stegodon* の系統に一の動搖が生じ, 主なる系統は印度に於いて, *insignis*

Parastegodon, Stegodon, Archidiskodon の亞細亞における分布表

Siwalik Series				Narbada	India (Pilgrim)	Malay (Martin, Naumann, Maarel, Koengswald)	China (Hopwood, Young, Granger, Matthew)	Nippon
Dhok pathan zone	Tatrot zone	Pinjor zone	Boulder conglomerate					
Stegolophodon latidens	*S. clifti* *S. bombifrons*	*A. planifrons*	*S. pinjorensis*		*S. ganesa* *S. insignis*			
		Lower Bumiaju		Upper Bumiaju & Trinil				
		A. planifrons	*P. trigonocephalus praecursor* *P. airawana*	? *S. bombolensis*	*P. trigonocephalus trigonocephalus* *P. airawana*	*P. mindanensis*		
Hipparion Red lay	Reddish Clay	Nihowan		Choukoutien	Loess			Sikisima
? { *S. yushensis* *S. zdanskyi* *S. officinalis*		*A. planifrons*	? *S. orientalis grangeri*		*S. sinensis*		*S. orientalis* *S. sinensis*	? *S. orientalis*
Mizuho								
S. latidens	? *S. clifti*	*Parelephas protomammonteus*	*P. aurorae* *P. alashtiensis* *P. kuantoensis* *P. infrequens*					*S. orientalis* *S. sinensis*

や *ganesa*, 支那に於いては *sinensis, orientalis* として殘存したが, 之と並行して, *Archidiskodon* の血を混じた *Parastegodon* が馬來群島及び本邦に起つて榮えた。馬來群島では洪積世まで殘存したが, 本邦や北支那の如く, 溫帶地方では環境が變り易く, 次々と新しい侵入移住者の壓迫が劇しい爲に, catagenetic な傾向の *Parastegodon* は洪積世に入るまでに絕滅してしまつたのではないか

と思ふ。*orientalis* や *sinensis* 等のプロパーな系統は反つて之より遅れて本邦に移住したらしい。*Parastegodon* の祖先を *bombifrons* とする事は矛盾がない。

終に臨み，種々御指導され，原稿の校閲をされた矢部先生に厚く感謝致します。

(Résumé)

On the Genus *Parastegodon*

by

Tokio Shikama

Parastegodon is a valid genus, though it little differs from the genus *Stegodon*, and specialization is continuous from one to another. Japanese species of *Parastegodon* are closely related to the Malayan forms of the so-called *Stegodon* (*mindanensis*, *trigonocephalus* and *airawana*); the latter like the former are distinct from the genotype of *Stegodon*. *Parastegodon* contains the following species; *P. aurorae* (Matsumoto), *P. mindanensis* (Naumann) Matsumoto, *P. trigonocephalus* (Martin) Shikama, *P. airawana* (Martin) Shikama, *P. akashiensis* Takai, *P. infrequens* Shikama and *P. kwantoensis* Tokunaga. From dental and cranological characters, *Parastegodon* is classified into three groups of *airawana*, *akashiensis-aurorae* and *infrequens-kwantoensis*. It is an oriental stock, having intermediate characters between *Stegodon* and *Archidiskodon*. In Japan it seems to have dissappeared at the end of the Tertiary owing to its catagenetic declination.

18. ヤグラモシホ貝 *Crassatellites foveolatus* (Sow.)[1] の殻の構造に就て

丹　桂之助

（昭和 11 年 6 月 13 日講演，6 月 15 日受理）

〔I〕 筆者は嘗て高雄州橋子頭泥火山から噴出する貝類化石に就いて研究したことがある。當時その材料採集中現場に於いて最初第 4 圖に示すやうな二個の標本を得て不審を抱いた。それは該標本は臺灣に現生するヤグラモシホ貝と相一致する特長を備へてゐるが，不思議にも表面の彫刻は輪肋 (Concentric ribs) の代りに全く放射肋 (Radial ribs) から成つてゐるのである。しかしこの不審は間もなく第 5, 6, 7 圖等の標本を得るに到つて氷解した。卽 *Crassatellites foveolatus* (Sow.) は風化作用によつてその輪肋の部分が消磨剝落すると，その內部から放射肋の彫刻が現れるといふ甚だ奇妙な事實が判明したのである。

〔II〕 ヤグラモシホ貝 *C. foveolatus* (Sow.) 〔=*C. yagurai* Makiyama 1927〕 は我が國では槇山博士によつて臺灣產現生標本と遠江の鮮新層からの化石の上に報告されたのが最初である。其後更に 1929 年横山博士によつて土佐の鮮新層からも報告されてゐるが，臺灣に於いては現生種，化石種の兩者が共に得られ，現生種は西海岸特に高雄附近の淺海に多く，化石種は泥火山噴出物，

(1) 黑田氏の御好意にて本種の學名は fide Lamy 1914 に從へば，*C. foveolatus* (Sow.) 1870 が正しく *C. sulcata* Rve. 1843 non Lamark, *C. yagurai* Makiyama 1927, *C. sulcata* Nomura 1933 non Lam., *C. kaneharai* Yokoyama etc. が Synonym なるを知つた。猶屬名の採用に就いては末尾の文獻を參照した。

琉球石灰岩層，苗栗層から採取報告されてゐる。

〔III〕 泥火山より産出した本種の固體數は約 15 個に達し，他の貝類に比して多い方である。之等標本は現生種と比較して何等の差がなく，その形狀性質は槇山博士の記載に精しいから，ここでは述べるに及ばない。次に泥火山標本中次のものに就いて說明する。

第 4 圖:—放射肋は局部的でなく普通の標本と同樣に全體に發達してゐる。その數は殼頂より後端に延びた斜從肋 (Carina) で劃された部分を除いて約 33 に達する。各肋はそれと略同幅の肋間溝 (Interstitial groove) によつて隔てられてゐる。肋の橫斷面は例へば，*Arca inflata* Rve. に見るやう矩形で，左右端が角張り，その表面は滑かでない。他の標本では必ずしも同樣でないが，第 4 圖では殼は殼頂より腹緣に到る中央で階段狀になつてゐる。この段は更に腹緣に近接した部分で又くり返へされてゐる。總て肋は之等の段で喰ひ違つてゐる。

第 5, 6, 7 圖:—輪肋の層は殼頂及びその附近で最も剝れ易く，その剝落した部分を觀察すると，上なる輪肋の層は甚だ薄く，これと下の放射肋の層とは判然相別れるやうに思はれる。

〔IV〕 殼の構造を充分觀察するため現生種標本に就いて薄片を作り，これを顯微鏡下で觀察した結果は次のやうである。

i) 第 1 圖の縱斷面では四部に區別される。

K (Konchinschicht) 外側の極く薄い部分で帶綠淡焦茶色を呈する。

P (Äussere Prismenschicht) 垂直の柱狀構造の層で，厚さ全體の約 1/3 を占め灰白色を呈する。

P_o (Innere Prism.—scht.) 緩斜の層理を示し，厚さ全體の約 1/3，前者より稍淡色。

P_m (Perlmutterschicht) 淡焦茶色，厚約 1/4，無構造。

之等は十字ニコルの下では方解石の Light greenish gray の high order の色を呈するのみで外に異狀は認めない。

ii) 第 2 圖の橫斷面では前述の大體 P に當る部分は，Konchinschicht の

下に水平の層理を示す部分 (G) と，更にその下に山と谷を作る起伏層の部分 (R) とに分けられる。その中 (G) は輪肋から成る部分であり，(R) は放射肋からなる部分である。(G) (R) 兩者の關係はこの寫眞でよく分るやうに放射肋に當る峯の部分では上層との境は判然とせぬ程密接なものであり，下方も亦同様で，漸次波の高さを減じて遂いに水平となり (P_0) に移つてゐる。卽放射肋の峯の部分では (G), (R), (P_0) は同一質物で其處に何等の不連續なところがない。しかし谷の部分卽肋間溝の部分は粗粒な結晶質のもので充塡されてゐる爲めかその四周とは明瞭な境界を示してゐる。

〔V〕 飜つて斯る構造は他の貝類にも見られるかに就いて吟味した。化石に於いて特に厚い殻の二枚貝では屢々殻が宛然岩石の玉葱構造を偲ばせるやうに剝落してゐるのを見ることがある。しかしその際寫眞に示したやうなヤグラモシホ貝に見る現象は嘗つて報告されたことを聞かない。自分はこの目的の爲めに稍々多數の二枚貝（約 50 種）の殻を縱と横の斷面に就いて檢鏡して見た。その結果 *Crassatellites*, *Glycimeris* のやうな殻の內面の周緣に皺 (Crenature) を有するある屬では中層に放射肋の發達を見るが，他の類にあつてはその發達がないことを知つた。卽 *Crassatellites* 屬では本屬の日本現生種 6 種[1]中 4 種の標本と，外に英國產[2]標本 1 種とを檢鏡し，他の屬にあつては *Glycimeris*, *Sunettina*, *Cyclina*, *Astarte*, *Anomalocardia*, *Chione* etc. の 1 乃至數種を檢した。以上は實驗せる種數，個體數が僅少であるが，しかし大體次のことが言ひ得ると思ふ。

1. *Crassatellites* 屬ではどの種も表面の輪肋の他に中層には放射肋の發達を示してゐる。之等の殻の構造は凡そ類似し，大體他と區別出來る。
2. *Crassatellites* 屬中ヤグラモシホ貝だけは放射肋の發達は甚だ强大で且

(2) 次の 6 種中檢鏡せるは 4 までである。

1. *C. foveolatus* (Sow.)　2. *C. nanus* (Ad. et. Rve.)　3. *C. japonicus* Dkr. (=*heteroglyptus* Pils.)　4. *C. adamsi* (Kobelt)　5. *C. corrugata* (Ad. et Rve.)　6. *C. sublameliatus* (Kobelt)

(3) *Crassatella sulcata* "Solander", Barton Bed, Eocene, Palaeontographical Soc. Monograph XXIV, p. 170, Pl. 23, f. 11, 1870.

表層に著しく近接してをり（第 2, 3 圖比較），之等の點で他と區別出來る。

3. 中層に放射肋を有するものは，大體殻の內面の周緣に襞を有する種類に限る。但しこの逆は眞でなく，分類上 *Crassatellites* に近緣な *Astarte*（2 種檢鏡），及びその外に *Anomalocardia*（1 種），*Cyclina*（1 種），*Chione*（1 種）等ではその發達を見ない。

4. 殻の檢鏡のみでもある特定の種屬は同定可能である。（この事に就ては後日を期してゐる）。

結語　第 4 圖に示すやうな標本が化石として單獨に產出した際には，その同定に誤りを招くかも知れない。しかし他方斯る特殊な構造はある範圍內では同定上の Criterion となるべく，特に標本が Boring Core などに得られる一破片に過ぎぬ場合に有效なるべく，從つて今後貝殻の構造組織の研究はこの點でも留意さるべきものかと思はれる。

擱筆に當り御敎示に預つた平坂，早坂の兩敎授，又標本を御惠與下され且種名其他について敎へて下さつた黑田德米氏に厚く感謝を捧げる。

文　獻

J. Thiele: Handb. d. Syst. Weichtierkunde, III, 1934, S. 845-846.

U. S. Grant, H. R. Gale: Pliocene and Pleistocene Mollusca of California, I, 1931, pp. 270-271.

黑田德米：ヴキナス, III (5), 1932, p. 207.

黑田德米：ヴキナス, V (2, 3), 1935, pp. 128-129.

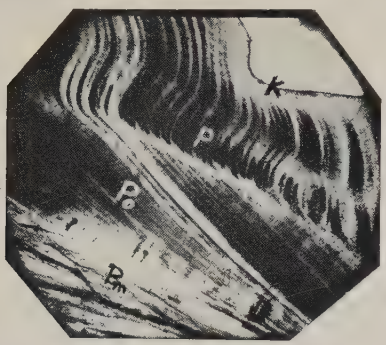
丹　桂之助：高雄州橋子頭泥火山から噴出する軟體動物化石に就て（臺灣地學記事, VI (12), 1935.

S. Nomura (野村七平): Catalogue of the Tertiary and Quartery Mollusca from the Island of Taiwan, I. (Sci. Rep. Tohoku Imp. Univ., II ser., XVI, 1933).

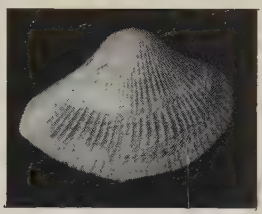
J. Makiyama (槇山次郎): Molluscan Fauna of the Lower Part of the Kakegawa Series in the Province of Totomi, Japan. (Mem. Coll. Sci. Kyôto Imp. Univ. Ser. B, III (1), 1927).

M. Yokoyama (橫山又次郎): Pliocene Shells from Tonohama, Tosa. (Imp. Geol. Surv. Jap. Rep. No. 104, 1929).

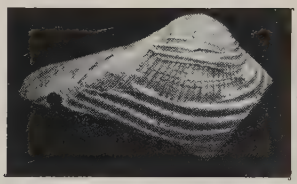
H. G. Bronn: Klassen u. Ordnungen d. Tier-Reichs, III, 1931.



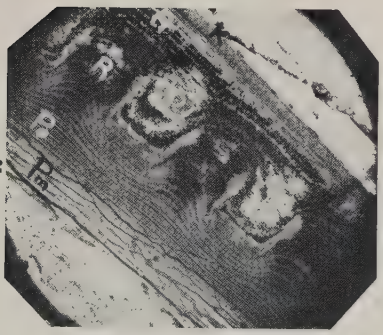
1



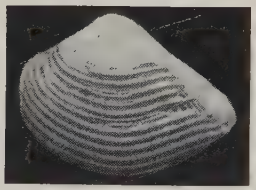
4



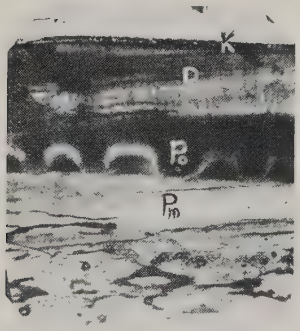
5



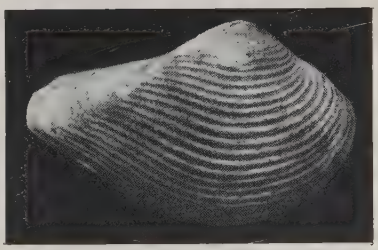
2



6



3



7

1. *C. foveolatus* の縦斷面　　2. 同　横斷面
3. *C. japonica* Dkr. の横斷面 (1-3 現生種　×60)
4-7. 泥火山産化石標本

On the Shell Structure of *Crassatellites foveolatus* (Sow).

(Résumé)

By

Keinosuke Tan

Surface of the shell of *Crassatellites foveolatus* (Sow.) is ornamented only with concentric ribs; beneath this surface layer, there is a layer which is characterized by radial ribs. The existence of this remarkable feature has been found recently in the course of studies with the recent and fossil specimens collected in and around Taiwan, as is shown by the figures 5, 6 and 7 on the annexed plate. When the surface, concentrically ribbed layer is worn off, it gives rise to a feature shown by fig. 4 looking as if to belong to a different species.

On examining under the microscope, thin sections, both transverse and longitudinal, of this and many other kindred species, the author has become confirmed of the fact that some of the shells with crenulated internal margin have a sub-surficial, radially ribbed layer, although in no other case the feature has been so conspicuous as in the species under consideration.

Within certain limits, such a peculiar feature of shells may play an important part in the specific or even generic identification among pelecypods.

Explanation of Plate 34 (9)

Fig. 1. Longitudinal section of *C. foveolatus* (Sow.)

Fig. 2. Transverse section of the same.

Fig. 3. Transverse section of *C. japonica* Dkr.

Fig. 1–3 Recent specimens. ×60.

Fig. 4–6 Fossil specimens ejected from the mud-volcanoes near Takao, Taiwan.

19. A New Roe-deer, Capreolus (Capreolina) mayai, n. subgen. and n. sp. from the Inland Sea of Japan.

By

Shigeyasu TOKUNAGA and Fuyuji TAKAI

[Read June 13th., 1936; received July 6th., 1936]

During the past half century Mr. Ukiti Maya, a resident of the city of Takamatu, has been collecting mammalian fossils from the Inland Sea of Japan. Last year he contributed his entire private collection to the Faculty of Science and Engineering, Waseda University, Tokyo. Upon examining these fossils now preserved at Waseda University, we found two specimens of a peculiar cervid which in our opinion belong to the genus *Capreolus*. The living species of *Capreolus* consist of the following three, namely, *C. caprea* Gray, *C. bedfordi* Thomas, and *C. pygargus* (Pallas). Of these *C. bedfordi* and *C. pygargus* now live in Northern China, Manchuria, and Korea. The primitive Roe-deers, *Procapreolus latifrons* Schlosser and *P. rutmeyeri* Schlosser, were found amongst the *Hipparion* Fauna of China.(1) This report deals with the first occurrence of the genus *Capreolus* in Japan Proper, living or extinct.

Genus *Capreolus* Hamilton-Smith, 1827.

Subgenus *Capreolina* Tokunaga and Takai, n. subgen.

Antler comparatively large, simple, rising together and almost vertically from the crown of the head and forming a single dichotomous fork. The first tine, which develops from the anterior surface of the antler at a point more than one-third of the total length, curves upward, making an angle of 70°–75° with the beam. The beam curves anteriorly, while its top indicates an antero-inner direction. The burr is prominent and

(1) M. Schlosser, Tertiary Vertebrates from Mongolia. Palaeontologia Sinica, Ser. C, Vol. I, Fas. 1, 1924.

O. Zdansky, Fossile Hirsche China. Palaeontologia Sinica, Ser. C, Vol. II, Fas. 3, 1924.

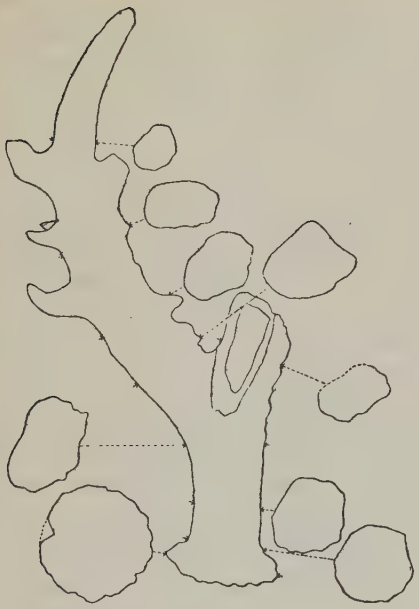
circular. At the part just below the first tine, the fore- and aft diameter is larger than the side-to-side one, its cross section being somewhat elliptical in shape. Although at the middle of the beam the section is subtriangular, near the top it becomes elliptical again. There are several series of longitudinal irregular nodules on the inner surface of the antler. Some of the nodules become larger and form tinelets.

Upon comparing the present antlers with those of a living Roe-deer, it was found that the present ones are intimately related to those of the *Hippocamelus* group, and should be included in the *Capreolus* group. Judging from their size, bifurcation, and surface ornamentation, *Capreolina* somewhat resembles *Hippocamelus*, a South American Guemal. But on account of the angle of bifurcation and of the curvature of beam, *Capreolina* differs from *Hippocamelus*. Compared with *Procapreolus* and the frequently described *Capreolus*, *Capreolina* has larger, more rugose, and single dichotomously forking antler. The second tine does not develop, but in Cervidae can often be seen several deformaties of antlers and degeneration of tines that are due to abnormality and to injuries to the organs. Our opinion therefore is that the loss of the second tine in *Capreolina* is due to these reasons. Since the surface ornamentation of *Capreolina* is more pronounced than that of the typical *Capreolus*, we regard *Capreolina* as a subgenus of *Capreolus* and believe that phylogenetically, *Capreolina* stand between *Capreolus* and *Hippocamelus*.

Capreolus (*Capreolina*) *mayai* Tokunaga and Takai, n. sp.

Material:—A right antler from the bottom of the sea, northeast off Kotuti-Zima, Kagawa prefecture, and a left antler from the sea bottom off Sirahama, Syodosima, in the same prefecture. Both specimens are now preserved at the Faculty of Science and Engineering, Waseda University, Tokyo.

Description:—The right antler (Pl. 35 (10), fig. 1) is rather large and dichotomously forking. The pedicle is believed to be rather short. The burr is very prominent and rounded. The first tine, which is damaged, branches at a point 110mm above the burr and at an angle of about 70° with the beam, curving upwards. The beam curves strongly, first outward, then backward, and finally sharply forward and slightly inward. Transverse sections are shown in Text-figure 1. Several series of longitudinal irregular nodules are recognized on its surface, although the



Text-fig. 1. Right antler. ×1/5

Text-fig. 2. Left antler. ×1/4

outer surface is rather smooth. Somewhat large tinelets issue from the antero-inner and postero-outer surface.

The left one (Pl. 35 (10), fig. 2) is rather large and also dichotomously forked like the right one. The first tine, which is almost damaged, issues from the beam at a point 105 mm above the burr, making an angle of about 75° with the beam. Transverse sections are shown in Text-figure 2. A keel runs on the outer surface, which is smoother than the right surface. Two tinelets are present on its posterior upper surface.

Dimensions:—

	Right antler	Left antler
Fore-and-aft diameter of pedicle just below burr	52.0 mm	42.0 mm
Side-to-side diameter of pedicle just below burr	51.0 〃	42.0 〃
Fore-and-aft diameter of burr	73.0 〃	59.5 〃
Side-to-side diameter of burr	70.0 〃	52.5 〃
Fore-and-aft diameter of beam just above burr	47.5 〃	43.0 〃
Side-to-side diameter of beam just above burr	44.0 〃	43.0 〃
Fore-and-aft diameter of first tine at its base	41.5 〃	49.0 〃
Side-to-side diameter of first tine at its base	39.0 〃	30.0 〃
Distance from burr to first tine	150.0 〃	122.0 〃
Fore-and-aft diameter of beam just above first tine	44.0 〃	40.0 〃

Side-to-side diameter of beam just above first tine	47.0 mm	34.0 mm
Fore-and-aft diameter of beam at its middle part	30.0 〃	31.0 〃
Side-to-side diameter of beam at its middle part	46.0 〃	34.5 〃
Total length in straight line from burr to top	380.0 〃	320.0 〃

Horizon:—Probably Pleistocene.

Remarks:—Compared with the Pontian *Procapreolus*, *P. latifrons* and *P. rutmeyeri*, the present species differs entirely from it in its surface ornamentation, the size of the first tine, and the angle of the first bifurcation. In the Korean Roe-deer, *Capreolus bedfordi*, including the Manchurian *C. mantchuricus*, the first bifurcation occurs at the middle part of the total length, where as in the present species the first tine issues from the beam at a point more than one-third the total length from the burr, while no second bifurcation can be recognized. Several series of strong longitudinal irregular nodules distinguish the present species from *C. bedfordi* and *C. pygargus*.

Bachofen-Echt has recorded the occurrence of *Capreolus capreolus* from the Pleistocene deposits of Würtemberg, Germany.[1] Judging merely from its figures, it greatly resembles the present specimens in the somewhat large tinelets and the many series of strong longitudinal irregular nodules.

The new specific name is given in honour of Mr. U. Maya who collected a large number of fossil specimens, including those here described, from the Inland Sea of Japan.

Finally we take this opportunity of expressing our heartiest thanks to Messrs. U. Maya and N. Naora for much valuable information.

Capreolus (*Capreolina*) *mayai* に就いて (摘要)

徳永重康, 高井冬二

新亜屬 *Capreolina* の角は比較的に大きく，一叉を備ふ。第一枝は角座の上方約 1/3 の所から分岐する。*Capreolus* 屬に特有な第二枝を缺いてゐるが此は退化に由るものと考へられる。角座は圓形にてよく發達し突起は非常に顯著である。角幹の中央に於て隣面亜三角形を呈するが尖端に近づくに從ひ再び楕圓形となる。内側に數條の疣狀突起列あり。疣

(1) Frh. Ad. Bachofen-Echt, Das Verkommen von *Capreolous* im Plistozän Württembergs. Palaeontologische Zeitschrift, Bd. 13, 1931.

狀突起のあるものは大きくなり小枝を造つてゐる。*Capreolus* (*Capreolina*) *mayai* を基本種とする。

現生鹿の角と比較し,*Capreolina* 亞屬が *Hippocamelus* 屬に近緣な關係にある事を知る。

しかし第一枝の分岐角及び角幹の反り方に於て差異が認められる。*Capreolina* 亞屬は第二枝を缺いてゐるがやはり *Capreolus* 屬に屬するものと思はれる。兩者の間の差異は第二枝を缺く事,第一枝の分岐點及び表面の疣狀突起列等による。

Capreolina 亞屬は模式的な *Capreolus* 屬と *Hippocamelus* 屬を結びつけるものと思はれる。猶ほドイツの Würtemberg の下部更新統より報告された *Capreolus capreolus* Linné は本種に近い者と思はれる。

Explanation of Plate 35 (10)

Capreolus (*Capreolina*) *mayai* Tokunaga and Takai.

Fig. 1a. Antero-outer view of right antler. ×¼.
Fig. 1b. Inner view of same. ×¼.
Fig. 2a. Inner view of left antler. ×¼.
Fig. 2b. Antero-outer view of same. ×¼.


1a
1b
2a
2b

20. *Molluscan Fossils from the Raised Beach Deposit of Takai, Tateyama-Hôzyô-mati, Tiba Prefecture*

(Studies on the Fossil Mollusca of the Bôsô Peninsula. No. 1)

By

Kôiti SUZUKI and Kenichi ICHIMURA

(Geological Institute, Faculty of Science, Imperial University of Tokyo)

[Read June 13 h., 1936; received July 6th., 1936]

One of the present writers (Ichimura), while surveying the geology of the southern part of the Bôsô Peninsula in 1934, has made a large collection of fossil shells from the raised beach deposit of Takai, Tateyama-Hôzyô-mati, exposed along cliffs on both sides of River Taki. The shells are excellently preserved and even the colour patterns are retained in many of them, though more or less faded. The number of the species determined is attained to sixty-four in total, which are distributed in twenty-eight species of Bivalvia, one of Scaphopoda, and thirty-five of Gastropoda, as listed below :—

Bivalvia

1.	*Nuculana confusa* (Hanley), 1860.	Rare.
2.	*Barbatia* (*Trigonodesma*) *yokoyamai* (Nomura), 1933.	Rare.
3.	*Anadara* (*Scapharca*) *inflata* (Reeve), 1844.	Not rare.
4.	*Chlamys* (*Chlamys*) *nobilis* (Reeve), 1852.	Rare.
5.	*Pecten* (*Pecten*) *laqueatus* Sowerby, 1842.	Common.
6.	*Ostrea* (*Ostrea*) *denselamellosa* Lischke, 1869.	Common.
7.	*Ostrea* (*Lopha*) *rosacea* Deshayes, 1836.	Not rare.
8.	*Ostrea* (*Lopha*) *imbricata* Lamarck, 1819.	Rare.

9.	*Ostrea* (*Crassostrea*) *gigas* THUNBERG, 1793.	Not rare.
*10.	*Lucina* (*Anodontia*) *bialata* (PILSBRY), 1895.	Rare.
11.	*Codakia* (*Pillucina*) *pisidium* (DUNKER), 1860.	Rare.
12.	*Cardium* (*Papyridea*) *muticum* REEVE, 1843.	Not rare.
*13.	*Dosinia* (*Dosinella*) *angulosa* (PHILIPPI), 1847.	Abundant.
14.	*Venus* (*Chione*) *micra* (PILSBRY), 1904.	Not rare.
*15.	*Venus* (*Clausinella*) *tiara* DILLWYN, 1817.	Rare.
16.	*Paphia* (*Paphia*) *euglypta* (PHILIPPI), 1847.	Common.
17.	*Paphia* (*Paratapes*) *undulata* (BORN), 1778.	Not rare.
*18.	*Clementia vatheleti* MABILLE, 1901.	Not rare.
*19.	*Zozia abbreviata* (GOULD), 1861, var.	Common.
20.	*Solecurtus divaricatus* (LISCHKE), 1869.	Rare.
21.	*Macoma* (*Pseudometis*) *praerupta* SALISBURY, 1934.	Rare.
22.	*Macoma* (*Macoma*) *tokyoensis* MAKIYAMA, 1927.	Rare.
*23.	*Macoma* (*Macoma*) *praetexta* (MARTENS), 1865.	Rare.
*24.	*Macoma* (*Psammacoma*) *candida* (LAMARCK), 1819.	Rare.
*25.	*Macoma* (*Psammacoma*) *vestalioides* (YOKOYAMA), 1920.	Rare.
*26.	*Macoma* (*Psammacoma*) *awajiensis* (SOWERBY), 1914.	Rare.
*27.	*Tellina* (*Fabulina*) *nitidula* DUNKER, 1860.	Rare.
28.	*Solen gouldi* CONRAD, 1867.	Rare.

Scaphopoda

*29.	*Dentalium* (*Dentalium*) *octangulatum* DONOVAN, 1803.	Abundant.

Gastropoda

30.	*Lemintina imbricata* (DUNKER), 1860.	Rare.
31.	*Batillaria multiformis* (LISCHKE), 1869.	Rare.
32.	*Cerithium* (*Proclava*) *pfefferi* (DUNKER), 1877.	Abundant.
*33.	*Cerithium* (*Proclava*) *kochi* PHILIPPI, 1875.	Rare.
34.	*Gourmya* (*Contumax*) *kobelti* (DUNKER), 1864.	Rare.
35.	*Epitonium* (*Lineoscala?*) *yokoyamai* n. sp.	Rare.
36.	*Epitonium* sp.	Rare.
37.	*Leucotina* (*Actaeopyramis*) *eximia* (LISCHKE), 1874.	Common.
38.	*Diala picta* A. ADAMS, 1861.	Rare.
39.	*Odostomia hilgendorfi* CLESSIN, 1900.	Rare.
40.	*Odostomia shimosensis* YOKOYAMA, 1922.	Rare.
41.	*Turbonilla dunkeri* CLESSIN, 1900.	Rare.
42.	*Turbonilla approximata* DALL and BARTSCH, 1906.	Rare.
43.	*Turbonilla multigyrata* DUNKER, 1860.	Rare.
44.	*Amathina tricarinata* (LINNAEUS), 1767.	Rare.
45.	*Crepidula* (*Syphopatella*) *walshii* (HERMANSON) REEVE, 1859.	Rare.
46.	*Strombus* (*Canarium*) *japonicus* REEVE, 1851.	Not rare.

47.	*Strombus* (*Canarium*) *succinctus* Linné, 1768.	Rare.
*48.	*Polinices* (*Neverita*) *didyma* ("Bolten" Röding), 1798.	Abundant.
49.	*Sinum* (*Eunaticina*) *papillum* (Gmelin), 1791.	Rare.
50.	*Tonna luteostoma* (Küster), 1857.	Not rare.
51.	*Rapana thomasiana* Crosse, 1861.	Rare.
52.	*Pyrene* (*Mitrella*) *varians* (Dunker), 1860.	Rare.
*53.	*Babylonia japonica* (Reeve), 1842.	Common.
54.	*Nassarius* (*Hinia*) *festivus* (Powis), 1835.	Not rare.
55.	*Nassarius* (*Tritonella*) *japonicus* (A. Adams), 1851.	Rare.
*56.	*Nassarius* (*Niotha*) *livescens* (Philippi), 1848.	Abundant.
57.	*Olivella consobrina* Lischke, 1871.	Rare.
58.	*Cancellaria* (*Merica*) *laticosta* Löbbecke, 1881.	Rare.
*59.	*Cancellaria* (*Narona*) *spengleriana* Deshayes, 1830.	Abundant.
60.	*Cancellaria* (*Solatia*) *nodulifera* Sowerby, 1825.	Rare.
61.	*Clavatula consimilis* (Smith), 1879.	Common.
62.	*Terebra* (*Strioterebrum*) *lischkeana* Dunker, 1882.	Rare.
63.	*Terebra* (*Strioterebrum*) *bathyraphe* Smith, 1875.	Rare.
64.	*Ringiclua* (*Ringiculella*) *arctata* Gould, 1860.	Not rare.

All the species reported by S. Nomura [1] from the same place a few years ago are also contained in this collection. They are marked with asterisks in the above list. *Barbatia yokoyamai*, *Chlamys nobilis*, *Epitonium yokoyamai*, *Diala picta*, *Odostomia shimosensis*, *Strombus succinctus*, *Cancellaria nodulifera*, *Clavatula consimilis* and *Ringicula arctata* have not hitherto been known from any raised beach deposits of the Kwanto District. *Diala picta* and *Strombus succinctus* are the first ones found as fossils in Japan.

Looking over the above list, one can recognize that this fauna is composed in main of the species characteristic of the Japanese Kurosio fauna, that it contains no element typical of the Oyasio fauna, and that it is most closely allied to the recent molluscan fauna of the Pacific coast between Bôsyû and Kii. Several species of the fauna have wide distributions in the subtropical and tropical seas from the Malay Archipelago to Japan. *Venus tiara*, *Zozia abbreviata*, *Sinum papillum*, *Nassarius livescens* and *Ringicula arctata* are such examples. Therefore, it may be concluded that the temperature of the water indicated by this fauna approximates to, or is slightly warmer than, that of Tateyama Bay of to-day, but

(1) Sitihei Nomura: "Mollusca from the Raised Beach Deposits of the Kwantô Region," Sci. Rep. Tôhoku Imp. Univ., ser. 2, vol. 15, 1932, no. 2, pp. 65 (1)–141 (77).

by no means warmer than that of the present Kii coast.

This faunal aspect is quite similar to that of the raised beach deposit of Zôsiki[1], about 1 km. north of Takai, as well as to that of the so-called "coral-bed of Awa[2]" developed along the southern coast of Tateyama Bay. But it is more or less distinct from that of the so-called "warm-sea deposit" of Kokubu[3], about 1.5 km. east of Takai, and from those of the raised beach deposits at Simohuziwara[4], Nagaoka[4], Tikura, Seto[4], Titose[4] and others located on the Pacific side of the peninsula.

According to the Ichimura's field observation, the raised beach deposit of Takai can be correlated to those of Zôsiki, Tikura and Seto, but it is a little younger than the "warm-sea deposit" of Kokubu. He has observed also that both sets of the deposits are set on the "coral-bed of Awa" with a distinct uncomformity between. As a result, the stratigraphical relation among the raised beach deposits of the southern part of the Bôsô Peninsula is tabulated below:—

Holocene	Raised Beach Deposits	Shell-Beds of Takai, Zôsiki, Tikura, Seto and Others
		Shell-Bed of Kokubu
		"Coral-Bed of Awa" (Shell-Beds of Numa, Kô, Kasana, etc.)
Pliocene-Miocene	Basement Complex	

The writers wish to express their hearty thanks to Dr. Teiichi Kobayashi for his kind advices during the preparation of this manuscript and to Mr. Tokubei Kuroda for his great assistance in some of the identifications and for the loan of some recent specimens of *Diala picta*. Thanks of the writers are also due to Mr.

(1) S. Nomura: *Op. cit.*

(2) M. Yokoyama: "Mollusca from the Coral-Bed of Awa", Jour. Coll. Sci., Imp. Univ. Tokyo, vol. 45, art. 1, 1924.

S. Nomura: *Op. cit.*

(3) S. Saheki: "Warm Sea Deposits of Tateno-mura, Awa", Jour. Geol. Soc. Tokyo, vol. 36, 1929, no. 434, p. 502.

(4) S. Nomura: *Op. cit.*

C. Ueki for photographing.

Descriptions of Interesting Species

14. *Venus* (*Chione*) *micra* (Pilsbry)

Pl. 40 (12), figs. 2–5

?1869. *Venus crenifera* A. Adams (not Sowerby), Ann. Mag. Nat. Hist., ser. 4, vol. 2, p. 230.
?1882. *Chione crenifera* Dunker (not Sowerby), Ind. Moll. Mar. Japonici, p. 197.
1904. *Chione micra* Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, vol. 56, p. 552, pl. 41, fig. 45.
1927. *Chione crenifera* Yokoyama (not Sowerby), Jour. Fac. Sci., Imp. Univ. Tokyo, sect. 2, vol. 1, pt. 10, p. 456, pl. 52, figs. 9, 10.
1932. *Chione* (*Timoclea*) *creniferoides* Nomura, Sci. Rep. Tôhoku Imp. Univ., ser. 2, vol. 15, no. 2, p. 83 (19).

Four left valves and one right valve were collected.

Living :—Bôsyû to Kyûsyû.

This species closely resembles *Anomalo cardia squamosa* (Linné) and even it is not improbable that the former merely represents an immature stage of the latter.

Out of Yokoyama's *Chione crenifera* from the shell-beds of Itikawa, Nomura has established a new species, *Chione* (*Timoclea*) *creniferoides*. In comparison with the type specimens of *Chione micra* Pilsbry, the specimens of *creniferoides* illustrated by Yokoyama have certainly a less quadrated outline with a more strongly protruded posterior end and more numerous and finer radial ribs. But, among the Yokoyama's collection from the same locality, there are some specimens almost identical with the types of Pilsbry's species, and the two forms are united into a continuous morphological series by many intermediate ones. Therefore, it may be understood that *C. micra* is tolerably variable in the outline and surface sculpture and *C. creniferoides* might be no more than a variant within this species. The continuous variation from *C. micra* to *C. creniferoides* can also be seen among a number of the recent specimens procured from Sagami Bay and kept in our Institute collection (Pl. 40 (12), figs. 2-4).

Chione crenifera described by A. Adams from the Inland Sea of Japan (Setouti) may possibly belong to this species.

Incidentally, *Chione mindanensis* Yokoyama (not Smith) from the Upper Musashino Formation of Semata, Tiba prefecture, ap-

parently resembles this species, but they are different in the hinge nature and surface sculpture and from which it is suggested that the former may be an immature form of a certain species of the genus *Protothaca*, probably of *P. jedoensis* (Lischke).

19. *Zozia abbreviata* (Gould) var.

Pl. 39 (11), figs. 10–18

Cf. 1861. *Solen abbreviatus* Gould, Proc. Boston Soc. Nat. Hist., vol. 8, p. 26.
Cf. 1861. *Azor minutus* Dunker, Proc. Zool. Soc. London, p. 425..
Cf. 1862. *Solen abbreviatus* Gould, Otia Conch., p. 164.
Cf. 1874. *Solecurtus abbreviatus* Sowerby, Conch. Icon., vol. 19, *Solecurtus* sp. 6, pl. 2, figs. 6a, b.
Cf. 1874. *Solecurtus minutus* Sowerby, *Ibid.*, *Solecurtus* sp. 11, pl. 3, fig. 11.
Cf. 1888. *Solecurtus abbreviatus* Clessin, Conch. Cab., vol. 11, pt. 3, Solenaceen, p. 93, pl. 22, fig. 3.
Cf. 1888. *Solecurtus minutus* Clessin, *Ibid.*, p. 94, pl. 24, fig. 4
Cf. 1920. *Solecurtus abbreviatus* Yokoyama, Jour. Coll. Sci., Imp Univ. Tokyo, vol. 39, art. 6, p. 111, pl. 7, figs. 12, 13.
Cf. 1928. *Solecurtus abbreviatus* Yokoyama, Imp. Geol. Surv. Japan, Rep. no. 101, p. 124, pl. 19, fig. 12.
1932. *Psammosolen abbreviatus* Nomura, Sci. Rep. Tôhoku Imp. Univ., ser. 2, vol. 15, no. 2, p. 90 (26), (parts).

Shell relatively small, thin, transversely oblong, slightly reniform, more than twice as long as high, compressed, inequilateral. Beaks situated at about the anterior two-fifths, contiguous, small, low, incurved and turned backward. Dorsal margin nearly straight, being the arching very slight; antero-dorsal very slowly descending, a trifle convex; anterior end regularly rounded; ventral margin almost straight, feebly excavated in the middle, and strongly arcuate up to neighbouring margins; posterior end obliquely sub-truncated, making a sharply rounded corner with the ventral border; postero-dorsal margin straight, scarcely descending. Surface concentrically marked with irregular incremental striae and provided with an indistinct groove running obliquely from the umbone to the posterior ventral side across the middle of the shell in addition to some very obsolete radiating ribs and furrows; median radial groove rather rapidly widening, and slightly or often even hardly depressed from the geneal surface, its posterior boundary more or less distinctly marked by a fine furrow, but its anterior border obsoleted and sometimes scarcely discernible. Interior of the shell with an indistinct, broad, but slightly elevated median radial ridge, which is corresponding to the external groove and obsoletely boundered by two furrows, besides many fine and faint radiating lines. Muscular impressions distinct but rather small, more or less irregularly ovate, the posterior one broader than the anterior. Pallial sinus tolerably large and broad, round or roundly quadrated, deep, approaching the me-

dian radial elevation but not extending beyond it. Right valve with two small, short, comparatively strong teeth, of which the posterior one is obliquely directed backward; left valve with one small but strong tooth.

Several right and three left valves were collected.

Living :—Japan (exact locality unknown). (*Zozia abbreviata* : Bôsyû to Ryûkyû, Japan Sea, Taiwan (Formosa), China Sea, Philippines, Malay, Netherlands East Indies, Malacca.)

Zozia abbreviata and its allies exhibit certain amounts of variation in outline and sculpture. Recently, B. Prashad[1] has ascertained that *Macha sheepmackeri* Dunker 1852, *Solen abbreviatus* Gould 1861, *Azor oblongus* Dunker 1861, *Azor solidus* Dunker 1861 (non Gray) and *Novaculina andamanensis* Preston 1908 are all synonyms of *Zozia coarctata* (Gmelin) 1790.[2]

The fossil shell from Takai is easily distinguishable from the typical form of *Zozia abbreviata* in its slightly more slender and evidently more inequilateral shell with a sub-triangularly protruded posterior end and a more obsolete and oblique medial groove, and its pallial sinus which is not extended beyond the median radial ridge. The proportion of the height to the length of the shell, the position of the beaks and the strength of the median radial groove are, however, variable to some extent in *Zozia coarctata*, *Z. abbreviata* and the fossil form of Takai in each (see Table). *Z. coarctata* illustrated by Forbes and Hanley[3] is, for example, closely akin to the typical form of *Z. abbreviata* in its general outline, while the specimens illustrated by Sowerby[4] and M. Hörnes[5] are similar to some fossil specimens of *Z. abbreviata* from Naganuma and Tumuki and also to the fossil form from Takai in regard to the somewhat more slender and inequilateral shell. Since there is no specimen of *Z. coarctata* in our collection, this species may now be put outside of the discussion. The typical form of *Z. abbreviata* appears to be linked to the fossil form from Takai without any distinct gap. The collections of fossil shells from the

(1) B. Prashad : Siboga Exped., monograph 53c, 1932, p. 311.

(2) *Solen coarctatus* Gmelin in Linnaeus, Syst. Nat., ed. 13, 1790, p. 3227.

(3) *Solecurtus coarctatus* Forbes & Hanley, British Mollusca, 1853, vol. 1, p. 259, vol. 4, pl. 15, fig. 3.

(4) *Solecurtus coarctatus* Sowerby, Conch. Icon., vol. 19, 1874, *Solecurtus* sp. 8, pl. 2, fig. 8.

(5) *Psammosolen coarctatus* M. Hörnes, Die Fossilen Mollusken des Tertiaer-Beckens von Wien, 1856, vol. 3, p. 21, vol. 4, pl. 1, fig. 18.

Naganuma (Pliocene) and Tumuki (Holocene) beds contains such intermediate forms, a few specimens (Pl. 39 (11), figs. 6-8) of which are very closely allied to the form from Takai, besides many specimens of typical *abbreviata* (Pl. 39 (11), figs. 9, 9a; Yokoyama, 1920, pl. 7, figs. 12, 13; Yokoyama, 1928, pl. 19, fig. 12). Therefore, the fossil shell from Takai may securely be understood as an extremity of the individual variation, or at most as a subspecies, of *Z. abbreviata*. In our Institute collection of Japanese recent Mollusca, there is found a single right valve (Pl. 39 (11), fig. 10) from an unknown locality which is almost indistinguishable from the fossil from Takai.

Zozia minuta (Dunker), living now in the Philippines, can hardly be distinguished from a certain immature form of *Z. abbreviata* (Pl. 39 (11), figs. 7, 8) from the Tumuki shell-beds. Further, it is also very similar to the fossil from Takai in the external feature, but its size is smaller and its posterior end is rather regularly rounded. The poor illustrations and brief descriptions of *Z. minuta* by Dunker, Sowerby and Clessin are insufficient for accurate comparison. Unless Dunker's specimen is actually studied, it can hardly be decided whether his species represents an immature stage of *Z. abbreviata* or not.

The dimensions of some individuals of *Zozia abbreviata* and its allies are listed below:—

Species	Locality	Specimen number	Kind of valve	Figure number on Pl. 39 (11)	Length in mm.	Height in mm.	Thickness in mm	Ratio of length to height	Ratio of posterior side to the anterior	Ratio of thickness to length in percentage
abbreviata	Malacca (Recent)	Reeve's specimen (after Sowerby)	right	—	40.0	19.0	—	2.11	1.17	—
	Coast of Bôsyû (Recent)	1	left	2,2a	43.2	21.2	6.0	2.04	1.34	13.9
		2	right	1,1a	43.2	21.0	6.0	2.06	1.34	13.9
		3	〃	4	38.4	19.0	4.8	2.02	1.34	12.5
		4	〃	3,3a	36.8	18.6	4.6	1.98	1.30	12.5
		5	〃	5,5a	34.4	17.1	4.9	2.01	1.29	14.2
		kf 552a	left	—	43.0	20.3	5.5	2.12	1.35	12.8

Species	Locality	Specimen number	Kind of valve	Figure number on Pl. 39 (11)	Length in mm.	Height in mm.	Thickness in mm.	Ratio of length to height	Ratio of posterior side to the anterior	Ratio of thickness to length in percentage
abbreviata	Naganuma (Upper Pliocene)	kf 552c	right	9,9a	42.1	21.0	6 2	2.00	1.20	14.7
		kf 552b	〃	—	38.4	18.3	5.2	2.10	1.26	13 5
		kf 552d	left	—	38.3	18.0	5.0	2.13	1.25	13.1
		kf 552e	right	—	30.5	14.8	—	2.06	1.52	—
	Tumuki (Holocene)	kf 5550a	left	—	26.7	13.2	2.9	2.02	1.43	10.9
		kf 5550b	left	6, 6a	20.6	9.8	2.4	2.10	1.58	11.1
		kf 5550c	right	8, 8a	16.7+	8.0	1.9	2.09+	1.49+	11.4−
		kf 5550d	left	7, 7a	16.7	7.8	2.0	2.14	1.49	12.0
abbreviata var.	Japan (Recent)	—	left	10, 10a	24.8	12.2	3.1	2.03	1.68	12.5
	Takai (Holocene)	1	right	12	31.6	14.7	—	2.15	1.66	—
		2	left	—	31.0±	14.8±	3.6	2.09±	1.56±	11.6±
		3	〃	17	31.0	14.5	—	2.14	1.74	—
		4	right	14, 14a	31.0	13.7	3.6	2.26	1.70	11.6
		5	〃	13, 13a	30.6	14.3	3.4	2.14	1.76	11.1
		6	〃	16	30.1+	14.5	3.2	2.08+	1.62+	10.6−
		7	〃	—	29.8±	13.0±	3.3	2.29±	1.50±	11.1±
		8	〃	15	28.2	13.7	3.5	2.06−	1.56	12.1
		9	left	18	27.7	13.3	—	2.08	1.56	—
		10	right	—	26.3	12.0	3.0	2.19	1.63	11.4
		11	〃	—	26.2+	12.9	3.1	2.03+	1.38+	11.8−
		12	〃	11, 11a	24.2	10.7	2.6	2.26	1.72	10.7
minuta	Philippines (Recent)	Dunker's specimen (after Clessin)	right	—	17.0	8.0	(2?)	2 13	1.43	(11.8?)
coarctata	Naples (Recent)	Reeve's specimen	left	—	31.4	14.3	—	2.20	1.75	—
	Britain? (Recent)	Forbes & Hanley's specimen	right	—	1.3/4 inch	7/8 inch	—	2.00	1.40	—
	Wien (Tertiary)	Hörnes' specimen	right	—	42.4	18.5	—	2.29	1.74	—

35. *Epitonium* (*Lineoscala ?*) *yokoyamai* n.sp.

1927. *Scala lyra* Yokoyama (not Sowerby, 1847), Jour. Fac. Sci, Imp. Univ Tokyo, sect. 2, vol. 1, pt 10, p. 417, pl. 47, fig. 2.

Only one small, imperfect specimen was collected.

Living :—Central Japan?

This species is quite distinct from *Epitonium lyrum* (Sowerby) in its evidently smaller size and its coarser sculpture. Also it is easily distinguishable from any other species of the genus from Japan, both recent and fossil, in the shape and sculpture of the shell.

38. *Diala picta* A. Adams

Pl. 40 (12), figs. 14–16

1861. *Diala picta* A. Adams, Ann. Mag. Nat. Hist., ser 3, vol. 8, p. 243.
1862. *Diala picta* A. Adams, *Ibid.*, vol. 9, p. 295.
1878. *Diala picta* Angas, Proc. Zool. Soc. London, p. 867.
1901. *Diala picta* Tate and May, Proc. Linn. Soc. New South Wales, vol. 26, p. 388.
1906. *Diala picta* Pritchard and Gatliff, Proc. Roy. Soc. Victoria, vol. 18, p. 61.
1913. *Diala picta* Hedley, Proc. Linn. Soc. N. S. Wales, vol. 38, p. 285, pl. 18, fig. 55.

Shell small, thin, regularly elongate-ovate, shining, with angled body whorl. Spire elevated, narrow and acuminated, about twice the height of the aperture. Protoconch small, conical, and composed of two smooth convex whorls. Whorls exclusive of the protoconch six, regularly slowly increasing, rather high between the sutures, feebly convex, somewhat contracted at the sutures; suture impressed, but not very deep. Last whorl slightly inflated, with angulated periphery; base rounded and very slightly contracted. Entire surface of spire and base marked by numerous spiral threads and lines of growth; spiral threads subequal, equidistant, and very closely set; these on the shoulder somewhat narrower and more obsolete than those on the base; lines of growth subvertical, a few of which are developed obsolete varices. Aperture subvertical, broadly oval, rather acutely angled above and somewhat effused below; outer lip simple, thin and sharp; columella slender, comparatively strong, slightly oblique and hardly arched; inner lip thin, very feebly expanded; parietal wall covered by a thin callus. Ground colour turned out into white, but colour bands and lines still discernible; bands spiral, narrow, chestnut brown coloured, five on the base and three on the shoulder, among the latters of which one is located near the upper suture, another at about the midst of the shoulder and still another close to the angle; on the later whorls a narrower band inserted between each pair of these three; colour lines, numerous, chestnut

coloured, fine, divided into short strips and arranged in longitudinal parallels.

Only a single specimen was collected.

Living :—Bôsyû to Kyûsyû. Japan Sea. Tyôsen (Korea).

In his description of this species from Takano-sima in Tateyama Bay, Bôsyû, A. Adams has given neither its illustration nor dimensions. The fossil from Takai as well as the recent shells from Urusan in Tyôsen (Pl. 40 (12), figs. 14, 15) agrees with the original description given by Adams and the illustration of the type specimen given by Hedley except for a band of opaque white spots on the last whorl. In comparison with the recent specimens from Urusan, this fossil is slightly less convex and less slender, more distinctly angulated and marked by spiral colour bands which are more uniform in breadth, a little more numerous and arranged more or less in different way. Moreover, its last whorl is not so strongly inflated.

The dimensions of the fossil from Takai and the recent specimens from Urusan are as follows :—

Loc.	Figure	Height in mm.	Diameter in mm.	Height of aperture in mm.	Diameter of apt. in mm.
Takai	(Pl. 40 (12), fig. 16)	6.8	3.0	2.7	2.0
Urusan	(Pl. 40 (12), fig. 14)	8.2	3.4	3.2	2.0
Urusan	(Pl. 40 (12), fig. 15)	7.2	3.1	2.7	2.0

47. *Strombus* (*Canarium*) *succinctus* Linné

Pl. 40 (12), figs. 18, 18a

1768. *Strombus succinctus* Linné, Syst. Nat., ed. 12, p. 1212.
1845. *Strombus succinctus* Küster, Conch. Cab., vol. 4, pt. 1, p. 39, pl. 7, fig. 14.
1847. *Strombus succinctus* Sowerby, Thes. Conch., vol. 1, p. 28, pl. 6, figs. 20, 21.
1851. *Strombus succinctus* Reeve, Conch. Icon., vol. 6, *Strombus* sp. 43, pl. 17, fig. 43.
1885. *Strombus succinctus* Tryon, Man. Conch., vol. 7, p. 116, pl. 6, figs. 56, 57.
1933. *Strombus* (*Labiostrombus*) *succinctus* Iw. Taki, Suisan Dô-yokubutu Zusetu, p. 492, text-fig.

A single well preserved specimen was collected. Its dimensions are as follows : Height, 52 mm.; Diameter, 29 mm. Height of the aperture (exclusive of the canal and channel), 40 mm.; Diameter of the aperture, 11 mm.

Living :—Sagami to Ryûkyû. Taiwan (Formosa). Philippines.

Although this characteristic and fine species is not uncommon

in the warm waters of Japan, its occurrence as a fossil has not hitherto been reported from Japan.

The fossil from Takai perfectly agrees with the descriptions and illustrations of this species given by Küster, Sowerby, Reeve, Tryon and Taki.

61. *Clavatula consimilis* (Smith)

Pl. 40 (12), figs. 6–12

1879. *Pleurotoma consimilis* Smith, Proc. Zool. Soc. London, 1879, p. 188, pl. 19, fig. 11.
1882. *Pleurotoma consimile* Kobelt, Conch. Cab, vol. 4, pt. 3, p. 190, pl. 37, fig. 7.
1920. *Drillia nivalioides* Yokoyama, Jour. Coll. Sci., Imp. Univ. Tokyo, vol. 39, art. 6, p. 39, pl. 1, fig. 27.
1927. *Drillia nivalioides* Yokoyama, Jour. Fac. Sci., Imp. Univ. Tokyo, sect. 2, vol. 1, pt. 10, pp. 393 (part), 440.
1935. *Clavatula consimilis* Otuka, Bull. Earthq. Res. Inst., vol. 13, pt. 4, p. 872, pl. 54, figs. 103, a-c.

Several specimens were collected.

Living:—Mutu Bay to Kyûsyû. Japan Sea. Tyôsen (Korea). China Sea.

The followings may be suggested by our renewed study on the Yokoyama's original specimens of *Drillia nivalioides*:—

1) *D. nivalioides* Yokoyama which has originally been instituted with two specimens from the Kosiba and Naganuma beds of the Pliocene age in Kanagawa prefecture may be a synonym of *Clavatula consimilis* (Smith).

2) The specimens collected from the Pleistocene shell-beds of Ôzi in Tokyo and Namamugi in Yokohama, and referred to *D. nivalioides* by Yokoyama also seem to belong to the Smith's species.

3) Those collected from the Pleistocene deposit of Dôkwanyama in Tokyo and from the Pliocene Omma beds at Omma and Nagaya, Isikawa prefecture, and referred also to *D. nivalioides* by Yokoyama on the other hand may be identifiable with *Clavatula patruelis* (Smith) and *C. patruelis dainichiensis* (Yokoyama) respectively.

4) Among the specimens of *C. consimilis* in our Institute collection, there are, however, two forms to be distinguished. One is represented by the specimens from Takai, Naganuma and Namamugi (Pl. 40 (12), figs. 6-8, 10, 11) and the other is typified by those

from Kosiba, Ôzi and Tumuki (Pl. 40 (12), figs. 9, 12) as well as the living specimens of Sagami Bay kept also in our Institute. The two differ in the axial ribs which are stronger in the former, but such a minor distinction may be insufficient even for the subspecific separation.

The dimensions of some individuals are as follows:—

Locality	Specimen number	Figure number on Pl. 40 (12)	Height in mm.	Diameter in mm.	Aperture	
					Height in mm.	Diameter in mm.
Sagami Bay (Recent)	1		15.3	5.2	5.6	2.1
Takai (Holocene)	1	6,6a	12.4	4.3	4.3	2.0
	2	7,7a	12.3	4.2	4.9	2.3
	3	——	12.1	4.2	4.7	2.0
	4	——	10.4	3.8	3.8	1.6
	5	8	10.2	3.9	3.9	1.8
	6	——	7.6	3.0	3.1	1.3
Ôzi (Pleistocene)	kf3349a (*D. nivalioides*)	9	12.2	4.4	4.7	2.0
Namamugi (Pleistocene)	kf3828 (*D. nivalioides*)	——	13.3	4.6	5.4	2.3
Naganuma (Upper Pliocene)	kf332 (Type of *D. nivalioides*)	10	14.0	4.6	4.6	2.2
	Another specimen	11	12.2	4.3	4.6	2.1
Kosiba (Pliocene)	kf331 (Type of *D. nivalioides*)	12	16.0	5+	6.4	?

千葉縣館山北條町高井産冲積世貝化石（摘要）

鈴木好一，市村賢一

昭和 9 年市村が採集同定せる標本を，更に鈴木が調査の上此處に報告する事とした。

總種數 64，內双殼類 28，掘足類 1，腹足類 35 種。化石の保存狀態は甚だ良好。

既に昭和 2 年に，野村七平氏が同一場所より 16 種の貝化石を報告して居られるが，其全部が筆者等の標本中にも見出された。又全 64 種中 9 種は野村氏が關東地方全體の冲積層から報告して居られないものである。

本貝化石群は主として日本要素と黑潮要素とより成り，典型的な親潮要素は 1 つも含まれてゐない。全體として，房州より紀州に至る海岸の貝類相に酷似する。從つて本貝層堆積地の水溫は現在の館山灣のそれと略ゝ同じか，幾分之より溫かゝつた程度で，紀州沿岸の水溫より高溫であつたとは思はれぬ。

又本貝化石群は近接せる國府村藏敷の冲積世貝化石群に最もよく類似し，所謂安房珊瑚層のそれとも可成り似てゐる。しかし館野村國府の「暖海堆積物」（佐伯四郎）や太平洋側諸地點（下藤原，長岡，瀨戶，千倉，千歲等）に於ける冲積層の貝化石群とは相當異る。これは堆積地（棲息地）環境の小差に基くのであらう。

市村の調査によれば，高井，藏敷，瀨戶，千倉等の冲積層は略ゝ同時期のものであるが，國府の「暖海堆積物」は之等より幾分古い。更に上記兩層は明瞭な不（非）整合を以て安房珊瑚層の上に載る。

最後に興味ある種類 6 種に就て記載並びに說明を加へておいた。尙 *Scala lyra* Yokoyama, 1927 (not Sowerby, 1847) に對し *Epitonium yokoyamai* なる新種名を提出した。

Explanation of Plates 39 (11), 40 (12)

Plate 39 (11)

(All figures natural size)

Zozia abbreviata (Gould)

Figs. 1-5. Recent specimens from the coast of Bôsyû.

Fig. 1. Specimen No. 1. Right valve; fig. 1, exterior; fig. 1 a, interior.

Fig. 2. Specimen No. 2. Left valve; fig. 2, exterior; fig. 2 a, interior.

Fig. 3. Specimen No. 4. Right valve; fig. 3, exterior; fig. 3 a, interior.

Fig. 4. Specimen No. 3. Exterior of right valve.

Fig. 5. Specimen No. 5. Right valve; fig. 5, exterior; fig. 5 a, interior.

Figs. 6-8. Specimens from the Holocene terrace deposit of Tumuki, Isikawa prefecture.

Fig. 6. Specimen No. kf 5550 b in the collection at Imperial University of Tokyo. Left valve; fig. 6, exterior; fig. 6 a, interior.

Fig. 7. Specimen No. kf 5550 d. Left valve; fig. 7, exterior; fig. 7 a, interior.

Fig. 8. Specimen No. kf 5550 c. Right valve; fig. 8, exterior; fig. 8 a, interior.

Fig. 9. Specimen No. kf 552 c from the Upper Pliocene Naganuma beds at Naganuma, Kanagawa prefecture. Right valve; fig. 9, exterior; fig. 9 a, interior.

Zozia abbreviata (Gould) var.

Fig. 10. Recent specimen from an unknown locality in Japan. Left valve; fig. 10, exterior; fig. 10 a, interior.

Figs. 11–18. Specimens from the raised beach deposit of Takai, Tiba prefecture.

Fig. 11. Specimen No. 12. Right valve; fig. 11, exterior; fig. 11 a, interior.

Fig. 12. Specimen No. 1. Exterior of right valve.

Fig. 13. Specimen No. 5. Right valve; fig. 13, exterior; fig. 13 a, interior.

Fig. 14. Specimen No. 4. Right valve; fig. 14, exterior; fig. 14 a, interior.

Fig. 15. Specimen No. 8. Exterior of right valve.

Fig. 16. Specimen No. 6. Exterior of right valve.

Fig. 17. Specimen No. 3. Interior of left valve.

Fig. 18. Specimen No. 9. Exterior of left valve.

Plate 40 (12)

Fig. 1. *Macoma* (*Psammacoma*) *awajiensis* Sowerby. Fossil from Takai. Left valve; fig. 1, exterior; fig. 1 a, interior. Length 16.0 mm., height 10.0 mm., thickness 2.5 mm. ×2.

Figs. 2–4. *Venus* (*Chione*) *micra* (Pilsbry). Recent specimens from Sagami Bay. ×2.

Fig. 2. Right valve; fig. 2, exterior; fig. 2 a, interior. Length 11.1 mm., height 9.1 mm., thickness 2.9 mm.

Fig. 3. Exterior of right valve. Length 9.3 mm., height 8.0 mm., thickness 2.5 mm.

Fig. 4. Exterior of left valve. Length 11.5 mm., height 10.0 mm., thickness 3.0 mm.

Fig. 5. *Venus* (*Chione*) *micra* (Pilsbry). Fossil from Takai. Exterior of left valve. Length 10.3 mm., height 8.6 mm., thickness 3.0 mm. ×2.

Figs. 6–8. *Clavatula consimilis* (Smith). Fossils from Takai. ×2.

Fig. 6. Specimen No. 1. Fig. 6, apertural view; fig. 6 a, back view.

Fig. 7. Specimen No. 2. Fig. 7, apertural view; fig. 7 a, back view.

Fig. 8. Specimen No. 5. Side view.

Fig. 9. *Clavatula consimilis* (Smith). Specimen No. kf 3349 a in the collection at Imperial University of Tokyo, from the Pleistocene shell-beds of Ôzi in Tokyo. (*Drillia nivalioides* Yokoyama.) ×2.

Figs. 10, 11. *Clavatula consimilis* (Smith). Specimens from the Upper Pliocene Naganuma beds at Naganuma, Kanagawa prefecture. ×2.

Fig. 10. Specimen No. kf 332 in the collection at Imp. Univ. Tokyo, one of the type specimens of *Drillia nivalioides* Yokoyama. Apertural view.

Fig. 11. Apertural view of another specimen from Naganuma.

Fig. 12. *Clavatula consimilis* (Smith). Specimen No. kf 331 in the collection at Imp. Univ. Tokyo, from the Pliocene Kosiba beds at Kosiba, Kanagawa prefecture. One of the type specimens of *Drillia nivalioides* Yokoyama illustrated by Yokoyama (Fossils from the Miura Peninsula and Its Immediate North, 1920, pl. 1, fig. 27). ×2.

Fig. 13. *Cancellaria* (*Merica*) *laticosta* Löbbecke. Fossil from Takai. Fig. 13, apertural view; fig. 13 a, back view. Height 37.2 mm., diameter 21.8 mm. Natural size.

Figs. 14, 15. *Diala picta* A. Adams. Recent specimens from Urusan, Tyôsen (Korea). ×3.

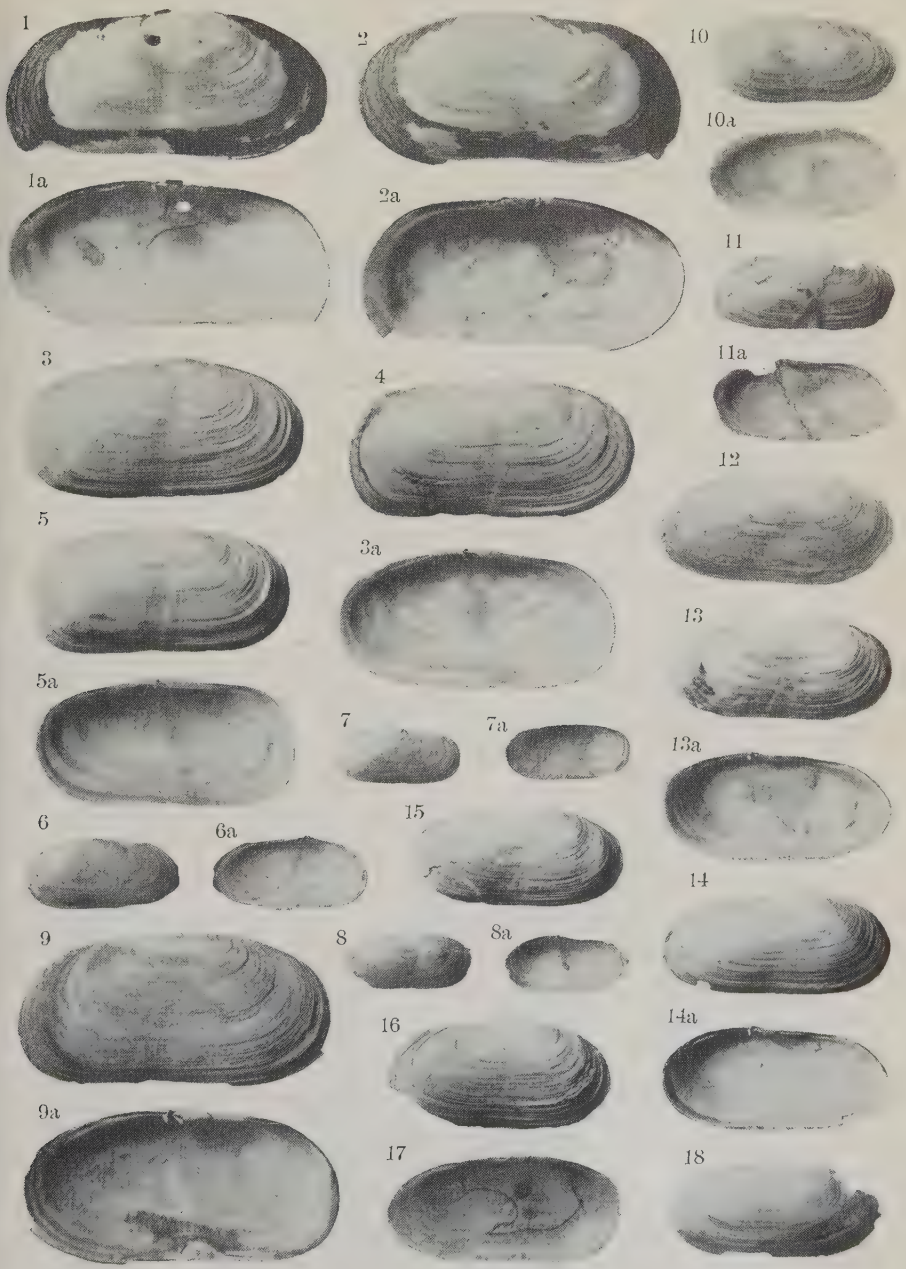
Fig. 14. Specimen No. 1. Fig. 14, apertural view; fig. 14 a, back view.

Fig. 15. Specimen No. 2. Fig. 15, apertural view; fig. 15 a, back view.

Fig. 16. *Diala picta* A. Adams. Fossil from Takai. Fig. 16, apertural view; fig. 16 a, back view. ×3.

Fig. 17. *Cerithium* (*Proclava*) *pfefferi* Dunker. Fossil from Takai. Fig. 17, apertural view; fig. 17 a, back view. Height 25.0 mm., diameter 8.0 mm. ×2.

Fig. 18. *Strombus* (*Canarium*) *succinctus* Linné. Fossil from Takai. Fig. 18, apertural view; fig. 18 a, back view. Natural size.


1
1a
2
2a
3
4
5
5a
3a
6
6a
7
7a
8
8a
9
9a
10
10a
11
11a
12
13
13a
14
14a
15
16
17
18

C. Ueki Photo.

Jour. Geol. Soc. Japan, Vol.43, Pl. 40 (12) (K. Suzuki and K. Ichimura)

C. Ueki Photo.

21. *Pliocene Mollusca from Manganzi in Kotomo-mura, Akita Pref., Japan.*

By

YANOSUKE OTUKA

(Contribution from the Earthquake Research Institute, Imp. Univ. Tokyo)

[Read June 13 th., 1936; received July 12 th., 1936]

The Pliocene mollusca from Manganzi in Akita prefecture studied by Dr. M. YOKOYAMA[1] a few years ago were collected from the Wakimoto sandy shale, the upper division of the Yuri series, which is believed to be Pliocene in age. On a cliff east of Manganzi village the Wakimoto sandy shale bed is exposed intercalating with a lens of fossiliferous sandy gravel. This lens of sandy gravel is the fossil locality of Manganzi. It contains many mollusca which the writer will call the **Manganzian** fauna. The writer[2] collected 25 species, besides the two species, *Pseudogrammatodon dalli obliquata* (YOKOYAMA) and *Glycymeris vestitus* (DUNKER), which have already been reported by M. YOKOYAMA. Table I shows the species of Manganzian fauna. Most of the Manganzian fauna are now living in Northern Japan and in cold deep waters. Of the Manganzian fauna (about 70%) 19 species are found in the fauna of the Onma series in Isikawa prefecture, which is believed to be the middle or lower Pliocene of Japan. The extinct species common to both faunae are *Limopsis tokaiensis* YOKOYAMA, *Mercenaria yokoyamai* MAKIYAMA, *Umbonium* (*Suchium*) *akitanum* SUZUKI, *Turritella* (*Haustator*) *saishuensis* YOKOYAMA, *Tachyrhynchus venustellus* (YOKOYAMA), and *Bittinm yokoyamai* OTUKA. Some of these fossil species are very common in the Japanese Pliocene. Brief descriptions of the new and rare species follow.

(1) M. YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, sect. 2, 1, 9 (1926).

(2) A detailed stratigraphy of this region was given by the writer in Bull. Earthq. Res. Inst. Imp. Univ. Tôkyô, 14, 3 (1936).

Table I.

Nucula (Nucula) niponica Smith
• *Yoldia (Cnesterium) keppeliana notabilis* Yokoyama
• *Limopsis tokaiensis* Yokoyama
• *Glycymeris yessoensis* (Sowerby)
• *Arca boucardi* Jousseaume
• *Anadara satowi ommaensis* Otuka n. subsp.
• *Astarte borealis* (Schumacher)
• *Astarte hakodatensis* Yokoyama
• *Venericardia ferruginea* (Clessin)
• *Cardium (Cerastoderma) ciliatum*? (Fabricius)
Mercenaria yokoyamai Makiyama
Spisula grayana Schrenck
Tellina sp.
• *Pandora (Kennerlia) pulchella* Yokoyama
• *Umbonium (Suchium) akitanum* Suzuki
Turritella (Haustator) saishuensis Yokoyama
• *Tachyrhynchus venustellus* (Yokoyama)
• *Bittium yokoyamai* Otuka n. n.
• *Polynices didyma* (Bolten)
• *Natica janthostoma* Deshayes
Tritonalia (Ocinebrellus) adunca (Sowerby) subsp.
Cancellaria murayamai Yokoyama
• *Antiplanes perversa contraria* (Yokoyama)
Lora ogurana (Yokoyama)
Lora dissoluta (Yokoyama)
Pseudogrammatodon dalli obliquata (Yokoyama)*
• *Glycymeris vestitus* (Dunker)*

Nucula (Nucula) niponica Smith (Fig. 1 a, b; 2)

1885 *Mucula niponica* Smith, Voy. H. M. S. Challenger Zool. Rep. *Lamellibranchiata*, p. 226, pl. 18, fig. 8, 8a.
1929 *Nucula (Nucula) niponica* Kuroda, "Venus" **1**, 3, App. p. 7, sp. 6.

Sowerby described this species as follows: "Testa magna, tenuis, ovalis, valde inaequilateralis, epidermide nitida olivacea induta, incrementi lineis tenuibus striata, lineis paucis radiantibus obsoletis impressa. Lunula inconspicua, impressione haud profunda circumdata. Umbones pallidi, convoluti, circa in 1/4 longitudinis totius positi. Pagina interna irridescens, caeruleo-margaritacea, radiatim tenuissima substriata, ad marginem

* The writer was unable to collect these species.
• = Common species between Omma and Manganzi.

acuta et integra. Fossa ligamenti profunda, intra valvas oblique projecta. Dentes elongati, acuti, in numero circa 25, quorum octo ante umbones sunt".

Type locality: 345 fath. South of Is. Nipon (=Japan).

Dimension of species:

	Length	Height	Thichness	No. of teeth.	No. of anterior teeth.
Type sp. (after Smith)	22 mm	15 mm	9 mm	24	8
Rg. No. 1096 in E. R. I. fr. NE Japan (fig. 1)	19 mm	12.7 mm	4.1×2 mm	25	8
Rg. No. 3084 in E. R. I. fr. Manganzi (fig. 2)	12 mm	9.5 mm	3×2 mm	?	?

Geol. range: Pliocene-Recent.

Hirase and the vessel "Sôyô maru" collected this species from Northeast Japan. The fossil from Manganzi is a small specimen lacking the anterior margin, but otherwise closely agreeing with Smith's description. Fig. 1 is the fossil species, while fig. 2 is the specimen from NE Japan.

Yoldia (*Cnesterium*) *keppeliana notabilis* Yokoyama

(fig. 4, 5)

1922 *Yoldia notabilis* Yokoyama, Jour. Coll. Sci. Tokyo Imp. Univ., 44, 1, p 196, pl. 17, fig. 10.

1927 *Yoldia notabilis* Yokoyama, Jour. Fac. Sci. Imp. Univ. Tokyo, sec. 2, 2, 4, p. 170.

1929 *Yoldia notabilis* Kuroda, "Venus", 1, 4, App. p. 11, sp. 40.

This species was first described by M. Yokoyama based on a fossil specimen from the upper Musashino formation. It is still found living, having been collected from northern and central Japan.

Type locality: Upper Musashino formation (Sisui, Ootake).

Dimension of species:

	Height	Length	Thickness	Number of teeth
Holotype in Geol. Inst. Tokyo Imp. Univ. Rg. No. 1611	18.8 mm	36.1 mm	4.5 mm	about 46
Rg. No. 1017 in E. R. I. fr. Haragama (Fig. 5)	28 mm	56.7 mm	7.1 mm	56
Rg. No. 3078 in E. R. I. fr. Manganzi (Fig. 4)	11 mm	29 mm	?	?

Geol. range:—Pliocene (Omma series in Isikawa pref.; Yuri series in Akita pref.)—Pleistocene (Sisui and Otaka in Tiba pref.)—Recent (northern and central Japan).

This species is closely allied to *Yoldia johanni* DALL[1], but the former has a shell with narrowed posterior end which is turned upward, whereas the latter has a shell with a broad posterior which is not upward. The concentric grooves on the shell surface of *Y. notabilis* YOKOYAMA reach the anterior margin. The oblique grooves do not reach the anterior end.

The living specimens of *Y. notabilis* YOKOYAMA are covered with blackish brown periostracum, while *Y. johanni* DALL is covered with yellowish brown periostracum. The muscular impressions of the left valve of the former species are shown in fig. 4. Fig. 4 is the fossil specimen from Manganzi and fig. 5 a living specimen from Haragama in Hukusima prefcture.

Yoldia scissurata strigata DALL[2] is another allied species to YOKOYAMA's species. But the former has a more equilateral shell. The original *Yoldia keppeliana* SOWERBY[3] is closely related to this species, but judging from SOWERBY's descriptions and text figures, the former is distinguished from the latter in its peculiar truncated posterior end. *Y. notabilis* YOKOYAMA has a shell narrowed in the posterior half.

***Anadara satowi ommaensis* OTUKA n. subsp.** (fig. 3, 8 a, b)

Shell medium sized, thick, subquadrate, longer than height, proportion of shell length and hinge length about 5 to 4, equivalve, slightly inequilateral roundly in front, obliquely truncate behind, broadly arched at ventre and without making any angle at antero-ventral or at postero-ventral corner. Surface radiately ribbed; ribs about 38–36, usually somewhat narrower than intervals or almost equal to intervals; growth lines fine, regular, a little elevated and crossing ribs as well as their intervals. Beak moderate, situated at anterior one-third of length of hinge line, curved inward. Hinge line straight, about 7/10.5 of shell length. Area lozenge shaped, ornamented with one oblique and one v-shaped grooves.

Dimension of holotype:

	Length	Height	Thickness	Number of ribs.
Holotype (Rg. No. 1089 in E. R. I.)	54 mm	44 mm	35 mm	38–36

Type locality: Nagaya near Kanazawa, Muddy sand of the

(1) DALL, Proc. U. S. Nat. Mus. 66, (1925), Art. 17, p. 31, pl. 19, fig. 2.

(2) DALL, U. S. Geol. Surv. Prof. Paper 59, pp. 18, 104, pl. 14, figs. 9-9 a, (1909).

(3) SOWERBY, Proc. Malac. Soc. London, 6, p. 176, text fig. on p. 177, (1904).

Omma series.

Original *Arca satowi* Dunker[1] is an allied species to this subspecies. But the former species has a shell with angulated antero-ventral margin. The most convex part of the ventral margin of the former is situated in the middle of the shell length, while that of the latter is at the posterior third of it. *Arca satowi castellata* Yokoyama[2] from the Pliocene of Dainiti has a more oblique shell with narrower hinge area.

Astarte borealis (Schumacher)

1817 *Tridonta borealis* Schumacher, Ess. Nouv. Syst. Hab. Vers Test., p. 47, pl, 17, fig. 1.

1881 *Astarte borealis*, E. A. Smith, Journ. Conch., **3**, pp. 216-220.

1922 *Astarte borealis* (Chemnitz), M. Yokoyama, Jour. Coll. Sci. Tokyo, Imp. Univ, **44**, 1, pl. 10, fig. 11 a, b.

1926 *Astarte borealis* Yokoyama, Jour. Fac. Sci. Imp. Univ. Tokyo, sect. 2, **1**, 8, p. 298, pl. 37, fig. 2, 3.

Geol. range: Miocene (Alaska)—Pliocene (Sawane bed in Is. Sado, Omma series in Isikawa pref.)—Recent (Northern Japan, Polar and Bering seas, Alaska).

Astarte hakodatensis Yokoyama

1920 *Astarte hakodatensis* Yokoyama, Jour. Coll. Sci. Tokyo Imp. Univ., **39**, 6, p. 140, pl. 11, fig. 5, 6.

1935 *Astarte hakodatensis* Otuka, Bull. Earthq. Res. Inst. Tokyo Imp. Univ., **13**, 4, p. 889, pl. 56, fig. 148, 149, 150.

Yokoyama reported living specimens of this species from Hakodate.

Type locality: Pliocene sand of the Kosiba bed near Yokohama.

Dimension of species:

	length	height	thickness
Holotype in Geol. Inst. T. I. U.	12 mm	11 mm	3.5 mm
Paratype in Geol. Inst. T. I. U.	10 mm	9.5 mm	3 mm
Sp. from Manganzi (rg. no. 3101)	9.5 mm	9.0 mm	2.7 mm

Geol. range: Pliocene (Kosiba bed, Omma series, Sawane

(1) Dunker, Index Molluscorum Maris Japonici (1882), pp. 233-4, pl. 9, figs. 1-3.

(2) Yokoyama, Jour. Coll. Sci. Tokyo, Imp. Univ., **45**, 2 (1923), pp. 17-18, pl. 2, figs. 10-13.

bed, Anden shell bed. Manganzi of the Yuri series.)—Pleistocene (Upper Musashino formation)—Recent (Hakodate).

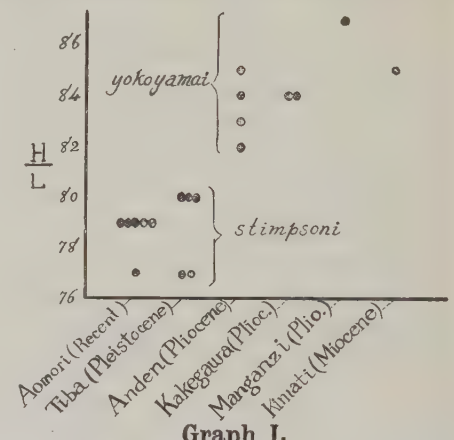
Mercenaria yokoyamai (MAKIYAMA) (fig. 6 a, b)

1923 *Venus* (*Mercenaria*) *stimpsoni* YOKOYAMA, Jap. Jour. Geol. Geogr., **2**, p. 6, pl. 1, fig. 5 (not of Gould 1861).

1926 *Venus* (*Mercenaria*) *stimpsoni* YOKOYAMA, Jour. Fac. Sci. Imp Univ Tokyo, sec. 2, **1**, 9, p. 381, 379.

1927 *Venus yokoyamai* MAKIYAMA, Mem. Coll. Sci. Kyôto Imp. Univ. ser. B., **3**, 1, pp. 47–46, pl. 2, fig. 8.

In its sculpture, this species is closely allied to *Mercenaria stimpsoni* (GOULD)[1], but the former has a longer shell. The differences between these two species will be clearly seen in the following table and graph 1, showing the dimension of the detached valves. The units are millimeters.



Graph I.

M. stimpsoni (GOULD)	86.0 mm	66.0 mm	0.77	(living Aomori pref.)
〃	86.5 〃	68.0 〃	0.79	〃
〃	90.5 〃	71.0 〃	0.79	〃
〃	91.0 〃	72.0 〃	0.79	〃
〃	104.0 〃	82.0 〃	0.79	〃
〃	55.0 〃	44.0 〃	0.80	(Pleistocene, Semata)
〃	91.0 〃	73.0 〃	0.80	〃
〃	93.0 〃	72.0 〃	0.77	〃
〃	95.0 〃	73.0 〃	0.77	〃
M. yokoyamai MAKIYAMA	73.0 〃	60.5 〃	0.83	(Pliocene of Anden)
〃	69.0 〃	56.5 〃	0.82	〃
〃	74.5 〃	63.5 〃	0.85	〃
〃	77.5 〃	65.0 〃	0.84	〃
〃	56.0 〃	47.0 〃	0.84	(Pliocene of Kakegawa)
〃	63.0 〃	53.0 〃	0.84	〃
〃	56.0 〃	48.5 〃	0.87	(Pliocene of Manganzi)
〃	40.0 〃	34.0 〃	0.85	(Miocene of Kimati)

Holotype: No. 220 in Kyôto Imp. Univ.

(1) GOULD, Otia Conch, p. 169 (1882).

Type locality: Hônohasi, Pliocene of Kakegawa, Siduoka pref.

Geol. range: Miocene-Pliocene. Fig. 6 shows the specimens from Manganzi.

Pandora (*Kennerlia*) *pulchella* Yokoyama (fig. 10)

1926 *Pandora pulchella* Yokoyama, Jour. Fac. Sci. Imp. Univ. Tokyo, sec. 2, 1, pt. 9, p. 387, pl. 45, fig. 4.
1933 *Calopodium pulchellum* Onoyama, Chikyû, 19, 4, p. 266.

Type locality: Anden shell bed (Pliocene).

Dimensions of species:

	Length	Height
Sp. fr. Anden (rg. no. 2210 E. R. I.)	28 mm	17 mm
Sp. fr. Manganzi (rg. no. 3099 E. R. I.)	33 mm	16 mm

Geol. range: Pliocene (Omma series, Takanosu series, and Yuri series).

This species is closely allied to *Pandora bicarinata* Carpenter var.(1) (fig. 7 a, b) and *Pandora wardiana* A. Adams, but the postero-dorsal margin of Yokoyama's species is straight or slightly concave while the latter two have convex dorsal margin.

The specimen from Manganzi is an imperfect right valve, but closely agrees with the description of Yokoyama and holotype and topotypes.

Tachyrhynchus venustellus (Yokoyama)

1927 *Bittium venustellus* (Yokoyama), Jour. Fac. Sci. Imp. Univ. Tokyo, sec. 2, 2, 4, p. 175, pl. 47, fig. 7.
1933 *Tachyrhynchus venustellus* Onoyama, Chikyû, 19, 4, p. 270.
1935 *Tachyrhynchus venustellus* Otuka, Bull. Earthq. Res. Inst., 13, 4, p. 855.

The specimen from Manganzi lacks the apertural part, but its dimensions and its characteristic four spiral cords closely agree with those of the type specimen.

This species was formerly believed to be *Bittium*, but it has

(1) Carpenter, Brit. Assn. Adv. Sci., Rep. for 1863, p. 638; According to Dall, *Pandora bicarinata* Carpenter is a synonym of *Pandora bilirata* Conrad (Proc. Acad. Nat. Sci. Philadelphia, 7, p. 267, 1855). *Pandora bilirata* Conrad has a more elongated lower shell than the Japanese specimen. Present writer considers that the Japanese *Pandora bicarinata* may be another distinct species, which is shown in fig. 7 a, b.

smooth spiral cords and no varix. The columellar end of this species is not canaliculated as in *Bittium*.

Type locality: Omma series near Kanazawa (Pliocene).

Geol. range: Pliocene (Omma series of Isikawa and Toyama perfecture; Yuri series of Akita prefecture).

Bittium yokoyamai OTUKA n. n. (fig. 12)

1926 *Bittium binodulosum* YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, sec. 2, 1. p. 270, pl. 32, fig. 15 (not of YOKOYAMA, 1920).

Shell high turreted, apical angle 18; lower half of shell surface of early whorls sculptured with two nodular prominent cords forming a periphery. Nodules situated at intersection of axial ribs and spiral cords. Upper half of early whorl sloped, sculptured with few spiral striae. Lower surface of later whorl sculptured with two or three weak spiral cords. Interspaces between these cords very narrow. On succeeding suture is a prominent smooth spiral cord; base slightly concave or flat, sculptured with five to six spiral cords; columellar end slightly canaliculated; later few whorls slightly varicosed; number of axial ribs 11 to 13 in earlier whorls, 18 to 19 in later whorls.

Holotype: Rg. No. 3100 in Earthq. Res. Inst. established as an incomplete specimen from Manganzi whose apical and apertural parts are slightly broken.

Dimension of holotype:

Number of whorl	height	largest diameter	apical angle
11	12.2 mm	3.5 mm	18

YOKOYAMA united this species with *Bittium binodulosum* YOKOYAMA[1] from the Pliocene near Yokohama, but this species has a larger shell with smaller apical angles than the latter.

Bittium binodulosum from the Omma series may be another distinct species.

Bittium binodulosum from the Upper Pliocene of the Sawane shell sand of Is. Sado agrees with this species.

Tritonalia (*Ocinebrellus*) *aduncа* SOWERBY subsp.

(fig. 9 a, b, 13 a, b, 14, 15 a, b)

1922 *Ocinebra falcata* YOKOYAMA, Jour. Coll. Sci. Tokyo Imp. Univ., 44, 1, p. 65, pl. 3, fig. 4 (not of SOWERBY 1840).

(1) M. YOKOYAMA; Jour. Coll. Sci. Tokyo Imp. Univ. 39, 6 (1920), p. 68, pl. 4, fig. 8.

Shell moderate, fusiform; whorls about eight, nuclear whorl two smooth, remainder angulated, almost horizontally and flatly truncated above, and slightly convex below angle; varicose; varices variable, from six to seven on body whorl, about eight on penultimate, eleven on preceding whorl of penultimate; in general, varices prominent near aperture, extended laminately showing prominent spinosity at angle.

Whole surface covered with spiral ribs. Narrow interspaces between these ribs excavated with fine longitudinal laminae. Number of spiral ribs about ten to eight on surface below angle of penultimate, three to four on surface above angle of penultimate. Suture slightly contracted. On body whorl four prominent and about thirty two spiral ribs. Aperture subelliptical, lip prominent, smooth within; outer lip with about fourteen weak horizontal furrows internally, which become obsolete inward; last varix forming broad lateral expansion to lip; canal closed slightly recurved backward.

Dimension of hypotype of fig. 13, 14, and 15.

Rg. no. 3098 (from Manganzi) (Fig. 15) height 44.5 mm; largest diameter 24 mm; height of apertural surface 30 mm; largest diameter of aperture 15 mm; shortest diameter of aperture 9.6 mm; Rg. no. 986 (from Semata, Pleistocene) (Fig. 13 a, b) height 43 mm; largest diameter 21.6 mm; height of apertural surface 29 mm; largest diameter of aperture 14.7 mm; shortest diameter of aperture 9.2 mm.

Geol. range: Pliocene-Pleistocene-Recent?

In its sculpture, this species is closely allied to *Tritonalia* (*Ocinebrellus*) *aduncа* (Sowerby)[1], but the former has a shell with less (6 to 7) prominent varices than the latter species, which however may be only an individual characteristic.

Ocinebra falcata of Yokoyama from the upper Musashino formation closely agrees with the specimen from Manganzi. Sowerby's *Tritonalia falcata*[2] may be a synonym of *Tritonalia aduncа* Sowerby.

Tritonalia barbarensis (Gabb)[3] is another form allied to this subspecies, but *T. barbarensis* (Gabb) has a higher shell than the latter.

Antiplanes perversa contraria (YOKOYAMA) (fig. 11)

1926 *Pleurotoma contraria* Yokoyama, Jour. Fac. Sci. Imp. Univ. Tokyo, sec. 2, 1,

(1) Sowerby, Con. Ill.

(2) Sowerby, Thes. Conch., 4, p. 44, pl. 394.

(3) Gabb, Proc. Calif. Acad. Sci, 3, p. 183, (1865).

9, p. 383, pl. 44, fig. 2 a, b.

1927 *Pleurotoma contraria* Yokoyama, Jour. Fac. Sci. Imp. Univ., Tokyo, sec. 2, 2, 4, p. 166.

1935 *Antiplanes kamchatica* Otuka, Bull. Earthq. Res. Inst. Tokyo Imp. Univ. 13, 4, p. 873.

Antiplanes perversa contraria (Yokoyama) is closely related to *A. kamchatica* Dall and *A. perversa* (Gabb).

Antiplanes kamchatica Dall[1] has a lower shell than *A. contraria* Yokoyama, and *A. perversa* (Gabb) has a higher shell than Yokoyama's specimen. Proportion of shell length and largest diameter of these three species are as below. [List I]

Type locality: Manganzi, the Yuri series in Akita prefecture. (Pliocene).

Geol. range: Pliocene (Omma series, Yuri series, Takanosu series).

All these species are ornamented with very fine striae which are visible with a magnifying lens.

List I.

	height (H)	largest diam. (D)	apical angle	D/H
A. kamchatica Dall	51 mm	27 mm	about 35°	0.53
A. perversa (Gabb)	38 mm	11 mm	about 30°	0 29
A. contraria (Yokoyama)	27.4 mm	9.2 mm	about 32°	0.34
〃	27 mm	8.6 mm	about 28°	0.32
〃	30 mm	9.5 mm	about 31°	0.32
〃	26.4 mm	8.6 mm	about 30°	0.33
〃	27.2 mm	8.4 mm	about 30°	0.31
〃	21.5 mm	6.7 mm	about 30°	0.31

秋田縣小友村萬願寺産の貝化石 (摘要)

大塚彌之助

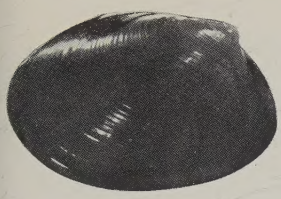
嘗て横山博士によつて研究せられた秋田縣由利郡小友村萬願寺産の貝化石の研究がしてある。採集數: 25 種, 産出層: 由利統脇本層。時代: 中下部鮮新統。石川縣大桑統の化石と共通のものが多い。*Inadara satowi ommaensis* Otuka 及び *Bittium yokoyamai* Otuka の記載がある。

(1) Dall, Proc. U. S. Nat. Mus., 56, 2288, pp. 33-34, pl. 10, fig. 1.

(2) Gabb, Proc. Calif. Acad. Sci., 3, p. 183, (1865).

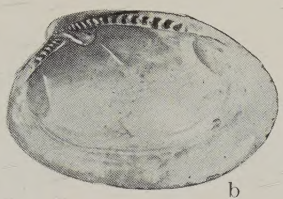
Explanation of Plates 41 (13), 42 (14)

Fig. 1 a. *Nucula* (*Nucula*) *niponica* Smith, outside view.
Fig. 1 b. *Nucula* (*Nucula*) *niponica* Smith, inside view of left valve.
Fig. 2. *Nucula* (*Nucula*) *niponica* Smith, outside view, specimen from Manganzi.
Fig. 3. *Anadara satowi ommaensis* Otuka, posterior view.
Fig. 4. *Yoldia* (*Cnesterium*) *keppeliana notabilis* Yokoyama, left valve, specimen from Manganzi.
Fig. 5. *Yoldia* (*Cnesterium*) *keppeliana notabilis* Yokoyama, left valve, specimen from Haragama coast.
Fig. 6 a, b. *Mercenaria yokoyamai* Makiyama, specimen from Manganzi.
Fig. 7 a, b. *Pandora* (*Kennerlia*) *bicarinata* subsp., specimen from Sagami bay.
Fig. 8 a, b. *Anadara satowi ommaensis* Otuka, specimen from Omma series at Nagaya nr. Kanazawa.
Fig. 9. *Tritonalia* (*Ocinebrellus*) *adunca* Subsp., sp. from Semata Pleistocene.
Fig. 10. *Pandora* (*Kennerlia*) *pulchella* Yokoyama, specimen from Manganzi.
Fig. 11. *Antiplanes perversa contraria* Yokoyama, topotype.
Fig. 12. *Bittium yokoyamai* Otuka, holotype.
Fig. 13 a, b. *Tritonalia* (*Ocinebrellus*) *adunca* subsp. specimen from Semata Pleistocene.
Fig. 14. (apical veiw).
Fig. 15 a, b. *Tritonalia* (*Ocinebrellus*) *adunca* subsp. specimen from Manganzi.



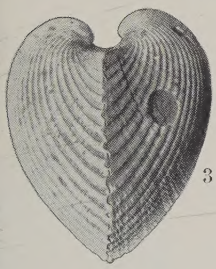
a

1

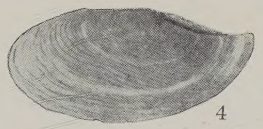


b

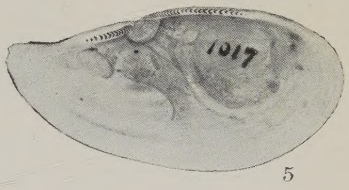
2



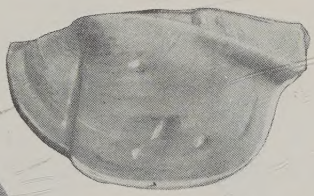
3



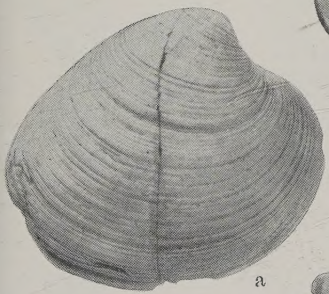
4



5



a

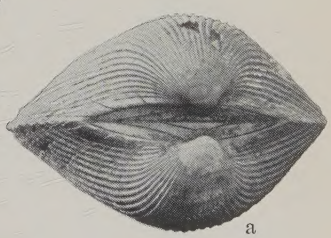


a

6

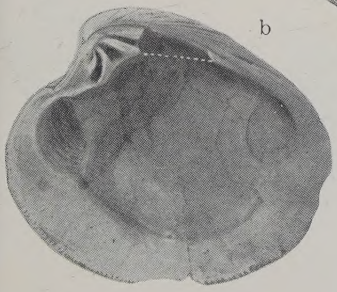
7

b

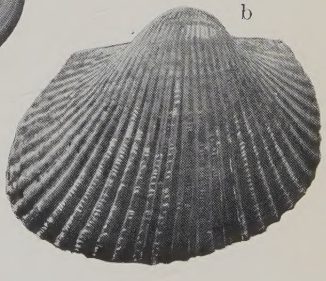


a

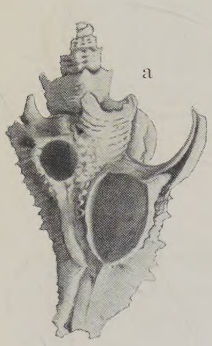
8



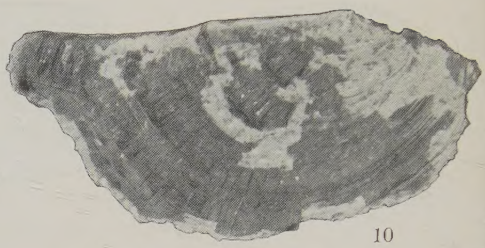
b

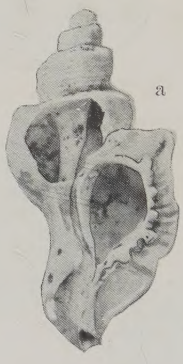


b


9
a


b

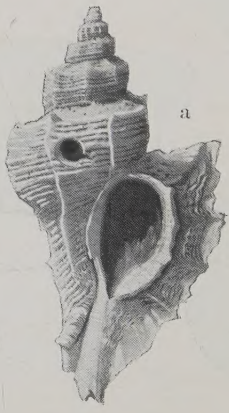

10

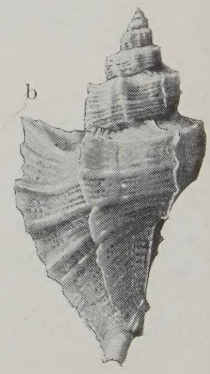

13
a

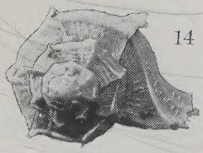

b


11


12


15
a


b


14

日本古生物學會規則

1. 本會ハ日本地質學會ノ部會ニシテ日本古生物學會ト稱ス
2. 本會ハ古生物學及ビ之レニ關スル 諸學科ノ進歩ヲ助ケ斯學ノ 普及ヲ圖ルヲ以テ目的トス
3. 本會ハ第2條ノ目的ヲ達スルタメニ總會及講演會ヲ開ク
4. 本會ノ紀事及ビ會員ノ寄稿ハ 地質學雜誌ニ揭載シ 其ノ別刷ヲ 日本地質學會々員ニアラザル本會々員ニ配布ス
5. 本會ノ會費ハ年額3圓トス, 但シ日本地質學會々員ハ年額1圓トス
6. 本會ニ次ノ役員ヲ置ク

   會　長　1　名
   評議員　數　名

7. 役員ノ任期ヲ 1 年トシ會員中ヨリ總會ニ於テ選擧ス

日本古生物學會役員

會　長	德永重康		
評議員	伊木常誠	井上禧之助	*大炊御門經輝
*大塚彌之助	大村一藏	加藤武夫	金原信泰
木村六郎	*小林貞一	立岩巖	*德永重康
中村新太郎	長尾巧	早坂一郎	*藤本治義
村上鈑藏	山根新次	矢部長克	(* 常務委員)

事務所——編輯所

東京帝國大學理學部地質學教室

日本古生物學會

(振替口座東京第 84780 番)

Constitution of the Palaeontological Society of Japan.

Article 1. The Society shall be known as the Palaeontological Society of Japan. It forms a section of the Geological Society of Japan.

Article 2. The object of the Society is the promotion of palaeontology and related sciences.

Article 3. This Society to execute the scheme outlined under Article 2, shall hold annual meetings and discussions.

Article 4. Proceedings of the Society and articles for publication shall be published through the Journal of the Geological Society of Japan. Separates and circulations will be sent to members of the Palaeontological Society who are not members of the Geological Society of Japan.

Article 5. The annual dues of this Society is two dollars for the foreign members of the Society.

Article 6. This Society shall hold the following executives. President one person, Councillors several persons.

Article 7. The President and Councillors shall be elected annually. The President and Councillors shall be elected from the Society body by vote of its members. All elections shall be ballot.

All communications relating to this Journal should be addressed to the

PALAEONTOLOGICAL SOCIETY OF JAPAN

Geological Institute, Faculty of Science, Imperial University of Tokyo, Japan